The Builder.

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THOUGH matters which appeared more immediately pressing have occupied our columns of late, we continue to think that the "Recent History of Architecture"—as not having been directly treated elsewhere—is a subject which it is desirable to pursue,—and considering that it is only by recalling to our minds what has led up to the existing state of art, that we can grasp the circumstances of the present and fix upon the best course for efforts towards the future. Where we last parted with the subject,* it might be seen that a singular combination of influences was at work throughout Europe, leading to the actual condition of architecture,—a condition which has been pronounced unprecedented, and which in our nation is thought to tell discreditably for public taste and the qualifications of our architects. That such opinions are commonly exaggerated indeed, we think also may have appeared,—as also that the circumstances were only such as were likely to supervene on influences anterior to the nineteenth century. It will not do, however, to take shelter from the possible adverse criticism of posterity under any excuses; but we should rather admit that our age, whilst singular in the character of its works, has been singular also in the number of its advantages, and that the error has really been in not knowing how to use an unusual wealth of materials. If we believe that the contemporaneous imitation or adaptation of a great number of opposite styles is not the course best fitted to the growth of *art*, be it recollected that nowhere has such system been so much fostered as in the capital of Bavaria. True, thirty to forty years ago, it might fairly be allowed that more of art was infused into buildings of a particular style and class in Germany, than into corresponding works in England. But, at the same time, if anything could reconcile us to our demerits, it would be found in what could be done by those very men whose reputation stands so high on the continent. Presuming that mere experimentalism—as seen in our own country in the use of several different styles by each architect—constitutes interference with that directness of aim which goes to make productive *power* in art—we shall find that a similar mistake was committed by Schinkel, and even by Klenze. The fame in this country, of both the great Germans, has rested upon their adaptations of Greek architecture,—in which they seem to have preserved all that is valuable in association as to an old style, whilst they developed and enlarged its resources, invented new forms, and infused fresh elements of art and beauty. But, not content to work on this theme—though one sufficiently expansible for a lifetime, and enough for one race of admirers to do justice to—they sought out new fields where they could not be equally successful. Klenze, perhaps, did not adopt his several styles of his own accord. Amongst his works are specimens in the old Greek, new Greek, and Greco-Italian (following one order of classification applied to them), and in the Byzantine, Gothic, and other styles. In all these he has some taste and skill, though not the likewise requisite knowledge of examples. Schinkel also manifested originality, and some taste, in a number of his works, which cannot be referred to any recognized style. But the changes of manner by both these artists, it appears to us, were unfortunate both as to their own powers and the public capability of appreciating. The Gothic of Schinkel is bad beyond the power of description; and Klenze fails in the same style almost as much as his brother artist. It is clear that if the initiative in a design is taken in the manner, or on the basis of an old style, there is always, to some extent, danger that the work will be either deficient in art by the very accuracy of imitation, or it will appear a mere caricature of the old style and proclaim the ignorance of its author. Such danger may, indeed, be inseparable from any active course. But it follows that complete knowledge of the old style *is required*,—on the one hand, even to gain the *art*,—and, on the other, to avoid the caricature. For this knowledge in the case of Gothic architecture, the mediæval buildings of England are the best school; and the continental architects to this day, seem hardly to have perceived the main characteristics of the general style. The mistake in England formerly was similar: it is now of the opposite nature. In short, it must be allowed that the demands upon the *artist*-architect are somewhat conflicting. Novelty is fairly demanded for its own sake; yet novelty alone is not art-work: it is not beneficial to public taste to lead it to an opposite channel: some relationship must there be to old style; yet knowledge of that must be used for the very purpose of *avoiding* the mere semblance of its monuments. From this difficulty then, in a certain class of works, it has resulted that there has been only offensive caricature, or accurate reduplication. Omitting any comparative estimate of the German Greek architecture, it may be asserted that some of its chief works are successful to the extent of our basis of criticism. It may likewise be affirmed, that in works of a similar class of England, ground is being established for similar commendation. We need but name St. George's Hall, at Liverpool, as an obvious instance. In Gothic architecture there has been also progress, though not wholly of the right character. But, on the continent, the progress in the same style seems to us less perceptible in any direction, unless we were called upon to include mere restorations of existing buildings.

However, the development of *art* which above has been more especially referred to, has reached this country somewhat later than it did the continent. We have seen some of the reasons of this. The influence of the Burlington school we believe to have been prejudicial. The greater amount of original *art* in the works of Chambers, Sir Robert Taylor, and even of Soane and Adam, was either limited to them, or it was exceptional in its effects. Henry Holland, and one or two others, had the right feeling; but James Wyatt and his school were but feeble imitators of one style; or such *art* as they could infuse into their Gothic works is unobserved, by reason of the obtrusion of forms, which they would clearly have avoided, with better knowledge of what had previously been done,—whilst also the results of their efforts to grasp too wide a field were unfortunate for the reasons before referred to. In the architecture of England, art had suffered a long *hiatus;* and even yet the whole reasons have not been perceived, which prevent our getting again into the right groove. Till very lately, the number of architects at all qualified for the direction of public works, bore no sort of relation to the demand for such works. The number *now* is in excess of the expressed demand; though it is not in excess of the requirement for good architecture and buildings. Our profession, formerly, had to learn how much the world then required in architecture; the public has now to learn how much of art the profession can and should supply

To realize good architecture at any time, a happy conjunction of elements must contribute to the process of design. The building must group well *en bloc*,—considering tasteful outline, "breadth," and massing of shadow, irrespective of other elements for consideration: it must have beauty and novelty—yet a certain degree of synchronism, elegance, and harmony of all associations in its details: its forms of structure and its forms of art must be in no antagonism with each other; its building materials must have the like harmony from the observance of their distinctive physical properties: the colour and surface must be such as light and shadow, as the chief sources of beauty, will tell upon (and with which light and shadow, shining surface, or depth of colour, may be so much interference): and the value of colour itself must not be left out of consideration. To omit none of such points, and still to keep them before the mind in logical sequence, may not be given to men of ordinary mould or ordinary acquirements. But, for that very reason, no less than on the score of those other *desiderata* in practical architecture which are obvious, should the subject of professional requirements and education no longer be in abeyance. There is error in the present state of taste as there was error before, in the regarding only a section or two of the positive essentials of good architecture. The mistake may not be the same mistake; but it is of fatal character. Some writers, and with reason, are not quite satisfied with the growing tendency which it is thought there is from the use of light towards that of darker-coloured materials,—seemingly passing, without consideration, the mistakes made through the medium of cement, as ordinarily used; whilst others, regarded as influential with the public, hail the appearance of coloured brickwork in street architecture as a thing newly discovered, and as though itself *per se* good architecture.

Some of the imperfections in the architecture of Nash have been already pointed out,—such as his forgetfulness of the unison required between decoration and structure, his erroneous application of cement, and the errors in details which resulted from the defects of his early education. He, however, recognised the value in art, of novelty other than the specious novelty expressed through mere changes of *style;* and he also set some value upon outline and grouping, as in themselves deserving of thought,—points which recently, during the study of details, there has been a tendency to get away from. Mr. Gwilt remarks, that Nash "was beyond doubt a person of great taste," and that had he "been enabled in his youth to have seen the works of Palladio, and to have studied them," he is "confident that the new street he formed would not have been exceeded in beauty by many in Europe." Truly, he adds,—"As far as he understood it, he was a follower of the Venetian school; but his great neglect of detail, and the little care he bestowed upon profiling his orders, arising from the deficiency of his early education as an architect, destroyed the effect of almost all his works. His columns are sometimes outrageous in their proportions, and his cornices rarely much larger than decent-sized copings. He was heedless of propriety in the application of his orders; and, from want of learning in his art, was unable to execute with any certainty the ideas of a very bold imagination." But he also remarks, that in the architecture "of his villas, he was far more successful than in his street architecture."

We apprehend that we might differ from Mr. Gwilt, not as to the value of the works of Palladio, but as to the principle upon which many

* *Vide* vol. xiii. p. 585-7, "Nash and Schinkel: Education of Architects."

of the English architects have approached them,—for it has unfortunately been with certain architects—as it has been sometimes remarked of painters—that they have come back from Italy worse *artists* than they were before. But taking the opinion of Mr. Gwilt as it is, we shall, perhaps, not be considered far wrong in our estimate of Nash. Could we hope that our exertions might have influence on future art, it would be important that our critical view should be even minutely correct. It is allowed that, whatever there may be of merit in particular buildings, and whatever squares and open spaces we may possess, London in effect of *street architecture* is miserably deficient. The first important effort was made in Regent-street; and nothing commensurate with it have we got to, since. There is Victoria-street: it is simply a line of roadway,—debouching, we are not sure, at the right place—considering the original plan, and the position of the great tower of the Houses of Parliament,—and it has nothing whatever, in the course of its length, made conducive, through plan of it and grouping of its buildings, to the street architecture. The merits of the particular buildings are not really part of the immediate question.

Nash, however, did feel the value of the important element in the result—plan. Thus, masses of his buildings combine towards a general effect, though varied from one another; whilst the several blocks carry out the principle of attention to plan. The defects of the architecture are great; and the praise of Regent-street, which at one day appeared in print, was inflated and ridiculous: but we must not allow defects to interfere with any lessons to us from such meritorious characteristics as there are. To show the value of grouping of masses, and of a certain amount of uniformity—without attention to which, what we mean by the effect of general *street architecture* is not gained—it would be sufficient to compare the view along Portland-place with that of Oxford-street. In the former locality, the work of the Adams (who preceded Nash in studying the important points referred to), in spite of the weakness of details, bears with it a particular element of impressiveness,—perhaps not very readily analyzed, but the want of which we painfully feel in Oxford-street; and which cannot be supplied by cement and greater pretension in decoration, details of better character, or even the occurrence of some superior designs. Returning to Regent-street,—the circuses, the crescent at the top of Portland-place, the general grouping of Waterloo-place, and the introduction of the Quadrant, demonstrate at least what no one else has produced,—with the exception of the architect Wood, of Bath, who lived some time previously. There are similar evidences in the grouping of the terraces in the Regent's-park. The Quadrant, according to one story, was the result of accident. It is said that ground on which the County Fire Office stands, intended to form part of the line of street, was obtained by the office unexpectedly, so that the street could not take its originally designed course. Without knowing the authority for the story, we should doubt it,—because the prolonged line, though better, perhaps, with reference to the Regent's-park, could hardly so well as the present line effect a junction with the foot of Portland-place. But whether the design of the Quadrant was the original one, or made to get over an accident, it is equally deserving of praise. Again, the Church of All Souls', Langham-place, is effective in its plan and its position; and each of these is admirably well adapted to the other. That there are defects in the building is sufficiently obvious; but that design has, perhaps, suffered most from the caricature wherein the architect was represented pierced through by his own spire.

There are fashions in theorising, as there are fashions in dress: one day, an architect is all that is great; shortly afterwards, the element of effect in which he happened not to excel comes into fashion, and straightway nothing good is believed of his works. This is unfair, and is most ill-advised for *art*. In every case the criticism is wrong which estimates on the basis of only one of such ingredients as we have shown must join to form a perfect work of art in architecture. Indiscriminate praise of Nash, or want of perception of such merits as he had,—either of these would mark immature knowledge of first principles. That there are essential constituent parts of good living architecture, without reference to systems of detail and styles, none will question. Yet what some of these are is from time to time forgotten both by architects, and by those who claim to instruct the public: one element is held in favour, to the exclusion of others; and the greater part of what would constitute *art* is disregarded for the pursuit of mere styles. What, however, are the essentials of good architecture should no longer on any side be misunderstood. First principles at least might be made familiar to all. They should be so made if the art is to be estimated, and if it is to advance. And, the duties and requisite qualifications of the architect should be somewhere set forth, so as alike to be called into use, and to be better responded to and supplied than they can be at present; and above all, no further delay should there be in establishing the first step to success—a well-arranged system of professional education. We referred to this latter point some time since, when we endeavoured to show the advantage which Schinkel had in that respect over Nash.—Nash, however, had some valuable personal qualities. He was an excellent "courtier;" or, as one would rather say, a *gentleman;* but there is no necessity to impute to him "sycophancy," to account for his success. Even more than that amenity of manner which some one has said is the best letter of introduction in the world, is required in the constitution of the practical architect. To sink your own opinions formed by study, whenever they are opposed, and appear to take up what you cannot believe, may indeed be neither conscientious nor politic for the common end of art. But to succeed as a practical architect, you must be more than artist or man of science. You must know *men*. True, there are those with whom no assiduity and probity on the part of an architect would protect him from unworthy suspicions, or interference prejudicial to the client's own interest. And there are those calling themselves architects who depend more upon their knowledge of men's weaknesses, than upon technical knowledge and skill. But we say, that, assuming a common aim and mutual forbearance, it will require knowledge of character on the architect's part, to secure the common end, whether through unanimity of opinion or deference to him. No professional man can be expected to give elaborate reasons at every step; but on the other hand, reasoning men will not give confidence till it has been won; and the most able artist and conscientious architect may promote all ends best through knowing what would be the likely current of thought in particular cases, in the mind of his client. The painter, in the mere professional business of his calling, may need such aptitude to less extent. If he possess the fitting artist's qualifications, he produces a painting, and has only to sell. Yet the architect, with corresponding qualifications, may never realize a conception, simply because he lacks the power to put the just view of his own case. Logic, the art of using reason well, is for the architect certainly no less than every other follower of a calling, the first of arts. And the knowledge of how men should, and of how individuals would decide, are closely related to each other. Hence comes the true secret of "unsuccessful great men." But Nash was more than a man of pleasing manners, or good business habits. His success was due in great degree to extraordinary habits of perseverance. This is illustrated by an anecdote. It is said that when very young, he was in a subordinate capacity in Sir Robert Taylor's office,—straining paper, copying letters, and the like. A sudden pressure of work came, and help was wanting. Nash, who had not had any employment previously in drawings, petitioned to be allowed to try his hand. More by way of amusement for his superiors than anything else, as it would seem, he was allowed to try. The result was, that after extraordinary exertions he completed a drawing, in such style that Sir Robert Taylor is said to have remarked,—"That boy will be an eminent man some day;" or, in other words, prognosticated his future success. Good lives of our later architects are much wanted.

During the period of Nash's career several foreign refugees came over, and became connected with him in various ways. Amongst the number was Augustus Pugin, a Protestant, who had no particular knowledge of architecture, but soon began to execute drawings in body colour, married a Miss Welby, took pupils, and was often engaged with his whole staff in assisting Nash. Mr. Ferrey, Mr. Talbot Bury, and Mr. Dollman were amongst Pugin's pupils. Mrs. Pugin was a lady of great energy, and it seems had pretty much the direction of the office. Mr. George Repton, who married one of the daughters of Lord Eldon, was amongst the pupils of Nash.*

Though Nash's style may be regarded as generally belonging to the Palladian school, in its day it was almost an exotic. Bad in detail and in the structural element of *architecture*, unfortunate in the treatment of shop-fronts, and in the manner of use of the lately-invented cement, the profuse employment of which led the late Alfred Bartholomew to call the Regent's-park-terraces "mortar-skimmings by the mile," it was yet not unworthy of commendation for one element in good architecture—scenic effect. But whilst with that object in view, the architectural efforts of our country at the time were not undeserving of notice, it could scarcely be otherwise than that they should be inferior to the works of the continent. To produce great works, commanding abilities are required in the artists; and we have seen how the Germans were ever educating themselves for the demands upon them which were to arise. No similar course had been pursued, or none to the like extent, by the English architects, or even could be. But there is a further contrast afforded. Architects cannot work till employment is given to them; and on the *manner* in which what is called "patronage" is exercised, as much as upon the labour of artists, the great works of a country depend.

THE MANUFACTURE OF BRICKS BY MACHINERY.†

The manufacture of bricks is a subject embracing so great a diversity of treatment, from local circumstances, the varying chemical quality of the earths or clays, and the great number of improvements lately introduced, as well as from the multifarious processes under which the manufacture is carried on, that I am obliged to abandon describing the principle best suited to each particular class of earth, and merely to give a general idea of the manufacture and the mechanical contrivances invented for its improvement; nor will the limits of this paper allow of more.

The process of brickmaking is one of the most ancient manufactures in the world. We are told in Scripture that the tower of Babel was built with well-burnt bricks; that the walls of Babylon were of a similar construction; and that the Israelites, during their oppression by the Egyptians, were employed in brickmaking. The ancient Romans were brick and tile makers: excellent specimens of their manufacture still remain. In England, bricks were not generally used until the middle of the fifteenth century. The Lollard's Tower, Lambeth Palace, built in 1454, is about the most ancient brickwork in London. The old part of Hampton Court was built in 1514.

I have given this glance at the antiquity of the process to show that, although so ancient, it has received scarcely any improvement from the aid of machinery until within the last few years.

* A well-informed correspondent, who wrote us with reference to our previous notice of Nash, says, "After leaving Sir Robert Taylor's, where he was at the same time with Mr. Cockerell, he practised in London as a measurer and a speculative builder. Then he retired to a property at Carmarthen, and associated with all the best men in the county, and at last took to architecture on a sudden impulse, instigated by a visit from Mr. Cockerell, who went down to Carmarthen in a chaise-and-four, while Mr. Nash was comparatively a poor man, for he had taken all the woods of Talliharries, in conjunction with one named Saxon, and, perhaps, lost money. He had a private theatre, among other things, and old Charles Matthews was one of his private company. His two first works were St. David's Cathedral, and a lodge (or some little thing), for Mr. Johns, of Hafod, a very intimate friend, and then he rapidly got business when it was known that he had resumed his profession. He never was a miniature painter, and I never even heard such a story before. He had the elder Pugin and Foulon, and Morgan, of the Regent's Canal (still alive), as his first clerks."

† Read by Mr. Humphrey Chamberlain, Draining Engineer, at the Society of Arts.

At the present time bricks are manufactured in the most primitive way. Those made by hand are generally of very inferior quality to machine-made ones. The numerous titles of the London bricks best illustrate the state of this manufacture. There are wash bricks, grey stocks, rough stocks, paviours, pickings, grizzles, place, shuffs, and numerous other titles. Now, there should be but one quality, if the process was carried out with good machinery, in a suitable manufactory, and those all best bricks. A very few experiments will prove a clay, as to what preparation or mixture of other earths it requires, and the temperature at which it burns to the best colour and soundest article. From the London makers so strictly adhering to the old system of handmaking and clamp burning, they have opened a market for makers by machinery over the country, who, from the superiority of their ware, command such a price that they can now afford to send bricks by railway, 80 and 100 miles, to the metropolis.

One great check to improvement, both here and at Manchester, is the existence of clubs amongst the men, but these must give way as other districts advance.

The importance of the brick trade is illustrated by the following:—

The quantity of bricks made per annum in this kingdom is about 1,800,000,000. Of this quantity Manchester alone makes about 130,000,000 per annum. What are termed the London makers produce about the same quantity, but bricks are sent to the metropolis from a circuit of 100 miles: it is, therefore, impossible to give exactly the consumption. Taking bricks at the low average of three tons per 1,000, the annual make exceeds in weight 5,400,000 tons, and the capital employed must be upwards of 2,000,000*l.* sterling.

Before entering on the manufacture by machinery, I will briefly describe the present process of making by hand, as practised in the neighbourhood of London.

The clay is dug in the winter, and spread over a large surface of ground, to expose it as much as possible to weather, more particularly to frost, to act on the compact tough mass, and so divide it into as small particles as possible, that during the summer or making season, labour may be saved in working in that quantity of water which is necessary to bring it into a ductile mass. This clay is thrown out in layers, over which are spread coal-ashes, or what is termed breeze, which perform several functions. First, they make the clay of a more porous and open character, which is attained by using sand in the country; secondly, they prevent the clay shrinking too much, and the sun and the wind cracking the bricks when drying; and thirdly, they are useful in the firing of the ware, by assisting to burn the bricks. Chalk is also added, for the sake of colour, and acts as a flux on the silica of the clay in burning. This is tempered by hand into an even mass of soft clay or mud, which is effected by turning it over several times with wooden spades, and at each turn working in as much water as possible. This operation is not considered complete until all the clay has absorbed an equal quantity of water, and becomes a thick plastic mud: to effect this pug-mills are also used, and chalk-mills, but the latter is more for the sake of colour, and is only a local practice. This clay is made into bricks by an artisan called the moulder, who is supplied by an attendant lad with a lump of the material, rather more than sufficient to fill a small box, in shape a parallelopipedon, called a mould, containing about 150 cubic inches, in some parts of the country nearly 200 cubic inches, varying a little in size in most districts. The art of the brickmaker, or moulder, is the knack with which he throws, or drops, this soft clay into the mould, so as to fill up every corner. This is apparently a very simple process, and is the one to which I shall have to draw your attention this evening, and the accomplishing of which by machinery has caused a vast expenditure of time and money, and occupied the attention of many leading mechanics for some years. These moulds are emptied by being turned over on a board called a pallet-board. The material used being soft clay, and the mould kept constantly wet by dipping in water between each charge (which is called slop-moulding), or sprinkled with sand or dust, the brick easily drops from the mould on its being held over the pallet-board. The bricks, when moulded, are carried or wheeled away to the hacks, or drying-floors, where they are placed edgeways, about half an inch apart, or the thickness of the pallet-board, one row on another until they form a wall six or eight bricks high: they are then covered up and left to dry, ready for the burning. This latter process we shall discuss in a succeeding paper.

The number of patents taken out, connected with the manufacture of bricks, has been obligingly supplied to me by Mr. Carpmael: they exceed 230. It would be impossible to describe each particular machine, and I, therefore, propose to illustrate, as clearly as I can, the several principles which have been attempted by these inventors, and with what success. I shall not occupy you by references to the earliest inventions, as we know they were not successful, or they would be worked at the present day; but will notice those principles now before the public.

Before commencing with the manufacture of the brick, we must prepare the raw material,—clay.

There are few places on almost the whole of the geological strata of this country, which do not possess alumina in combination with silica and other earthy matters forming a clay from which bricks can be manufactured. That most generally worked is found on or near the surface in a plastic state. Others are hard marls on the coal measures, new red sandstone, and blue lias formations. It is from these marls that the blue bricks of Staffordshire and the fire bricks of Stourbridge are made. Marl has a greater resemblance to stone and rock, and varies much in colour,—blue, red, yellow, &c. From the greatly different and varying character of the raw material, there is an equal difference in the principle of preparation for making it into brick; while one merely requires to be turned over by hand, and to have sufficient water worked in to make it subservient to manual labour, the fire-clays and marls must be ground down to dust, and worked by powerful machinery before they can be brought into even a plastic state. Now these various clays also shrink in drying and burning from 1 to 15 per cent. or more. This contraction varies in proportion to the excess of alumina over silica, but by adding sand, loam, or chalk, or (as is done by the London brick-makers) by using ashes or breeze, this can be corrected.* All clays burning red contain oxides of iron, and those having from 8 to 10 per cent. burn of a blue, or almost black colour. These bricks are exposed in the kilns to great heat, and when the body is a fire-clay, the iron melting at a lower temperature than is sufficient to destroy the bricks, gives the outer surface of them a complete metallic coating. These bricks are common in Staffordshire, and when made with good machinery (that is, the clay being very finely ground), are superior to any in the kingdom, particularly for docks, canal or river locks, railway bridges, and viaducts. Other clays contain lime and no iron: these burn white, and take less heat than any other to burn hard enough for the use of the builder, the lime acting as a flux on the silica. Many clays contain iron and lime, but where the lime is in excess, the bricks are of a light dun colour, or white, in proportion to the quantity of that earth present; if magnesia, they have a brown colour. When iron is in excess, they burn from a pale red to the colour of cast-iron, in proportion to the quantity of metal, as I before explained.

There are three classes of brick earths:—

1st. Plastic clay, composed of alumina and silica, in different proportions, and containing a small per centage of other salts, as of iron, lime, soda, and magnesia.

2nd. Loams, or sandy clays.

3rd. Marls, of which there are also three kinds; clayey, sandy, and calcareous, according to the proportions of the earths of which they are composed, viz. alumina, silica, and lime.

Alumina is the oxide of the metal aluminium, and it is this substance which gives tenacity or plasticity to the clay, having a strong affinity for water. It is owing to excess of alumina that many clays contract too much in drying, and often crack on exposure to wind or sun. By the addition of sand this clay would make a better article than we often see produced from it. Clays contain magnesia and other earthy matters, but these vary with the stratum or rock from which they are composed. It would be impossible to give the composition of these earths correctly, for none are exactly similar; but the following will give an idea of the proportions of the ingredients of a good brick earth;—silica three-fifths, alumina one-fifth, iron, lime, magnesia, manganese, soda, and potash forming the other one-fifth.

The clay, when first raised from the mine or bed, is, in very rare instances, in a state to allow of its being at once tempered and moulded. The material from which fire-bricks are manufactured has the appearance of ironstone and blue lias limestone, and some of it is remarkably hard, so that in this and many other instances which I shall have to notice, in order to manufacture a good article, it is necessary to grind this material down into as fine particles as possible.

Large quantities of bricks are made from the surface marls of the new red sandstone and blue lias formations. These also require thorough grinding, but from their softer nature it can be effected by less powerful machinery.

The principal machines which have been worked for this purpose are three—1st. The pug-mill. 2nd. The wash-mill. 3rd. The rolling-mill.

The pug-mill is a cylinder, sometimes conical, generally worked in a vertical position, with the large end up. Down the centre of this is a strong revolving vertical shaft, on which are hung horizontal knives, inclined at such an angle as to form portions of a screw, that is, the knives follow each other at an angle forming a series of coils round this shaft. The bottom knives are larger, and vary in form, to throw off the clay,—in some mills vertically, in others horizontally. Some have on the bottom of the shaft one coil of a screw, which throws the clay off more powerfully where it is wished to give pressure.

The action of this mill is to cut the clay with the knives during their revolution, and so work and mix it that on its escape it may be one homogeneous mass, without any lumps of hard untempered clay; the clay being thoroughly amalgamated, and in the toughest state in which it can be got by tempering. This mill is an excellent contrivance for the purpose of working the clay, in combination with the rollers, which I shall describe presently; but if only one mill is worked, I should not adopt it generally, for, although it tempers, mixes, and toughens, it does not extract stones, crush up hard substances, or free it from all matter injurious to the quality of the ware when ready for market. This mill can be worked by either steam, water, or horse-power; but it takes much power in proportion to the quantity of work which it performs. If a brick is made with clay that has passed the pug-mill, and contains stones, or marls not acted on by weather, or lime-shells (a material very common in clays), or any other extraneous matter injurious to the brick, it is apparent from the action of this mill that it is not removed or reduced. The result is this, the bricks being when moulded in a very soft state of tempered material, or mud, considerably contract in drying, but the stones or hard substances not contracting cause the clay to crack; and even if they should not be sufficiently large to do this in drying, during the firing of the bricks there is a still further contraction of the clay, and an expansion of the stone from the heat to which it is subjected, and the result is generally a faulty or broken brick, and on being drawn from the kilns the bricks are found to be of inferior quality, commonly termed addled—that is, having no ring or metallic sound when struck—liable to great waste from breakage in carriage and otherwise deteriorating the ware. In the case of lime, on exposure to the atmosphere these shells, from absorbing moisture, lax or swell, forming lime powder, and in so doing burst the brick to pieces.

* Before commencing to work a bed of clay, in the first place it is necessary to ascertain its contraction in drying and burning; secondly, how this can be corrected at the least expense if in excess. The necessary proportion of sand, lime, or chalk, would so vary with the clays, that no rule could be laid down, and it must be left to actual style.

Next is the wash-mill; but this I must merely glance at, as it cannot be practically worked for the manufacture of common bricks on a large scale, but only for front bricks. By a general adoption of good brick machinery, and a more general knowledge of the preparations of clays, we should have all our bricks equal in quality to what are now termed front bricks. This mill is a large circular trough, round which is a horse-walk. The clay is worked in this trough with water by harrows, drawn by one or two horses, until it is all thoroughly mixed up into a fluid state. It is then let off into a pit at a lower level through a grating, or a series of gratings, which extract all stones and coarse undivided particles. In proportion to the fineness of these gratings or sieves, so is the quality of the clay. It is there left to subside; the water is then let off from the top, and the clay, when sufficiently stiff, is thrown out for work. By this means clay can be prepared of the finest quality. This is the principle on which china and earthenware clays are prepared after grinding. The expense would prevent its becoming general with brickmakers; and in the case of fire-clays, marls, or any such earths as produce our best materials, it would be useless until they were ground down. It also consumes a large quantity of water, which could not be had in sufficient abundance in many districts.*

MECHANICS APPLIED TO PURPOSES OF WAR.

If dread war is to continue a stern necessity, civilised man must make it, as much as possible, mechanical. Huge ships of war are propelled by steam and screw: gun-boats, by aid of the same potent power, will "glide wherever it is a little damp;" and there is no reason why in our next war an army shall not have its field machinery as well as its field artillery. Portable steam-engines may be made to do the work necessary in war, as effectively as they now aid in all the requirements of peace. This has been proved by Sir S. M. Peto; as, amidst the thunder of artillery at Sebastopol, might be heard the panting of the steam-engine, the clanking of the forge, and the whizzing of the circular-saw. It is to this use we wish to direct attention now in time of peace, that experiment and training may perfect machines, and allow time to learn their full use. Portable steam-engines may grind, bore, saw, pump, and in many other ways aid the sapper and artizan soldier. We take it for granted, the army works corps of Sir Joseph Paxton will be matured into a permanent military body. There is a prejudice amongst military men against new appliances of a civil character. Even after the terrible winter in the Crimea, the best joke (in their opinion) certain staff officers made was, that the railway had carried all it was made to carry, and all it was fit for, namely, a baronetcy to Sir S. M. Peto. It would have been as well if some of these gentlemen had as honestly earned their honours.

The steam-boat workshop, steam-boat bakery, the railway, and the army works corps, nicknamed "the army drunks corps," did good service, and it is to be hoped sneers from ignorant officials will not retard the use of machinery, but that all possible means will be taken to make steam do the work of flesh and blood. Steam aids in manufactures, in agriculture, in navigation, in naval war, and may be made to aid in field war.

If all our ships of war having steam-power on board have (to a limited extent) circular-saws, planing-machines, mortising-machines, &c. to be used in time of need, neither vessel nor crew will be less efficient for actual war. If portable steam-engines go out with the sappers, they need not be more difficult to carry along than field artillery. Timber for huts, for gun-platforms, for temporary bridges, for stockades, and for all other the purposes of war, may then be cut and converted in an enemy's country. The Black Sea is bordered by as fine timber as any in Europe or Asia: the Black Sea fleet lay months idle, with an immense steam-power idle also: will it be considered treason, if we hint that some of this timber might have been cut, and might, by the dormant steam-power, have been converted to use for the siege? Let us prepare ourselves to do better next time.

* To be continued.

MIDDLESEX INDUSTRIAL SCHOOLS COMPETITION.

Your statement in the *Builder* of the 2nd instant, with reference to the plans sent to the committee of magistrates, is perfectly correct. Out of forty-one plans, the professional referees selected seven as being the best, or rather the least bad; and of those seven one received the lowest premium.

The plain truth is, that the competition greatly disappointed the magistrates, and unless I am much mistaken the referees were astounded at the worse than mediocrity displayed by the competitors. As you state, even those they selected were all open to objection in their professional view, while in a practical point of view they were deplorably defective.

The main results sought for in such a design are thorough ventilation and good light, facilities for supervision, and easy communication from all parts to central offices and workshops, preserving complete separation for sections of the inmates, according to the paper of instructions. I do not profess to have much skill in architectural elevations, but a large number of the plans presented very curious resemblances to old plans of prisons and workhouses, with new faces of the florid Cockney school, pastry-cooks' Gothic, and Elizabethan beershop style. There were a few which displayed some little confidence in the simplicity of a large mass of buildings; but the accompanying details were wanting in nearly all that was requisite.

Now, what is a committee to do? I feel confident that no committee ever deserved success more than ourselves. We offered liberal premiums, sought professional aid to assist our judgment, and the result is an utter failure. If we had confided the commission to any one architect, there would have been a yell from the profession against a flagrant and scandalous job. Eminent architects will not compete; but in the discharge of a public trust we felt we should best satisfy public or professional jealousy by an open competition.

I have come to the conclusion that the proverb, as to the intellectual condition of those persons who "build," as contrasted with those who "buy," is quite as much at the service of the profession as of the public.

P. Northall Laurie.

*** The present position of the affair is shown by the following determinations of the committee on the 21st and 28th of July.

"21*st July*, 1856.—The committee having heard the explanations of the three architects to whom the premiums have been awarded, in regard to the objections made to the respective plans, are not at present prepared to recommend any one of the three, and they therefore will entertain and consider any other plan that may be brought before them by any individual member of the committee."

"28*th July*, 1856 — Resolved, that this committee do now adjourn to Monday, 4th October next, and that any further plans which any member of the committee may wish to propose in pursuance of the resolution of the 21st inst. be sent to the Sessions House, Clerkenwell, on or before Monday, the 25th August next."

We are curious to learn on what grounds the committee justify their disregard of the recommendation of the professional referees. Are we to suppose that the committee are better judges than the architects to whom they referred the selection? They passed over designs selected by their own referees, and rewarded designs which they find they cannot recommend for adoption. The proceeding is certainly most irregular. As to the demerits of the designs submitted, or the justice of the referees' selection, we can say nothing of ourselves, no opportunity having been afforded us to see the drawings.

Manchester Mechanics' Institution.—The new building, erected and just completed for the Manchester Mechanics' Institution, is to be opened on the 19th proximo, with an exhibition including statuary, pictures, various fine art manufactures, and a collection of machinery in motion.

CHURCH-BUILDING NEWS.

Grantham.—The cemetery buildings are progressing. Mr. Wilson is the builder. The new road and bridges are also in a state of forwardness. The line of road has been altered for the second time at the curve. The last alteration, we understand, is made for the accommodation of the proposed road to the militia barracks or storehouses.

Braintree.—The contractor for the restoration works at Braintree Church, Mr. Parmenter, has commenced building the scaffolding preparatory to the repairs of the tower and spire, the portion of the proposed works which the committee have resolved shall be first executed.

Tunbridge.—The Local Burial Board, on considering the designs sent in for the chapel to be erected in the new cemetery, decided on adopting that furnished by Mr. Messenger, of Folkestone, architect.

Burwash.—The Burwash parish church, which has been restored, and adapted for the accommodation of the inhabitants, was reopened on 30th ult. for divine service. The chancel has been entirely rebuilt on the old foundation, and the details of the windows have been copied from the originals. In most cases the old stones have been re-worked. The roof is panelled, and the original pitch has been adhered to. The chancel-arch has been repaired. The aisles have been rebuilt and widened,—the windows and doors copied from the originals. The nave and aisle roofs, which form one continuous line, have also been restored. The tower, which forms the most ancient portion of the church, being of very early Norman, if not Saxon, architecture, has also been restored. Before the alterations there were doors and a modern staircase leading to the belfry, but the tower arch has now been thrown into the church, and a ringing-floor above provided, and an external turret-staircase on the south side, entered from the churchyard. There is a porch at the western end of the tower of the same date as that of the north arcade, viz. about 1360, and which has been entirely rebuilt, the same details as that of the original being followed. The restoration has been undertaken by the Rev. J. Gould, the rector, assisted by a rate and subscriptions. The east window, executed by Mr. Ward, of London, from the cartoon of Mr. Clayton, is the result of a special contribution for that purpose. The churchwardens, Messrs. Telly and Hyland, says the *Surrey Standard*, intend filling the two windows in the west end of the tower with stained glass. The works have been carried out from the designs and superintendence of Mr. William Slater, of London, architect, as successor to the late Mr. Carpenter, who had made a survey and plan of the church. The works were executed by Mr. Pannett, builder, Tunbridge. The whole expense of the restoration will be about 3,000*l.*

Winchester.—Lords Redesdale, Saye and Sele, and Tenterden, the Speaker of the House of Commons, Mr. Justice Erle, Sir William Heathcote, Bart. and various other M.P.s and other gentlemen have formed themselves into a committee for raising a subscription amongst Wykehamists for the purpose of erecting, near the chantry of William of Wykeham, in Winchester Cathedral, a memorial window and tablet in honour of those of their brother Wykehamists who died on the field, or from sickness, during the late war.

Warwick.—A new church has been opened in the parish of St. Nicholas, Warwick. The church, dedicated to All Saints, stands on a site presented by the Earl of Warwick. It is in the Decorated style, and consists of nave, south aisle, chancel, south chancel aisle, and north and south transepts. There is a vestry on the north side of the chancel. On the west side of south transept is the tower, containing the principal entrance to the interior, and intended to be hereafter surmounted by a spire. The interior, calculated to afford accommodation for 580 persons, is fitted with open benches, and the chancel with stalls. Two-thirds of the sittings are free. The walls are constructed of brick, with blue lias stone facing and moulded work. The tracery and other dressings, internal and external, are of Bath stone. The roofs are constructed of open framing of Memel timber,

stained and varnished, and are covered externally with tiles. The architect was Mr. James Murray, of Coventry. The contract for the whole was 3,100*l.*

West Littleton.—The church of West Littleton, which, says the *Bristol Mirror*, is the third in the same parish that has been restored and enlarged within the last three years and a half, was re-opened on 31st ult. The works connected with it have been carried on, as were those of Tormarton and Acton Turville, by Mr. Miller, of Seagry, under the direction of Mr. T. H. Wyatt, of London, architect. The only part remaining of the original edifice are the walls of the chancel: all the rest, including the bell-turret, it was found necessary to reconstruct. A new and larger nave and porch and vestry-room have been built. The whole of the interior has been re-arranged and made capable of containing more than double the former number of worshippers. A new font, of Tormarton-stone, has been erected. The stained glass window at the east end is the work of Mr. Miller.

Wrexham.—The laying of the foundation-stone of St. Mark's Church, Wrexham, took place on Monday before last. The church, which is partly built, having been begun two months ago, is situate in the Hope-road, not far distant from the new Roman Catholic chapel, now in course of erection. The ground was given by Sir W. W. Wynn (who also subscribed towards the erection), and measures 100 yards by 50 yards. There will be 800 sittings, and a tower and spire. The church will be in the Early Decorated style (from the designs of Mr. Kyrke Penson, of Swansea), and will consist of a nave, two aisles, two transepts, a chancel, and vestry, with a bell-turret adjoining the vestry. The extreme length will be 132 feet, and the width of the nave and aisles 57 feet. The roof of the nave will be 68 feet, that of the transepts 56 feet high: the roof will be an open timber one. The sittings will consist of open stalls, and at present it is not proposed to have galleries. At the south-west corner of the building it is intended to erect the tower and spire, 168 feet high.

Nantwich.—For some time past the ancient parish church of Nantwich has been undergoing the process of restoration by Mr. Scott. The projected, and now only partially completed, restoration is on a large scale, 8,000*l.* being the architect's total estimate for what was required to be done. Towards this sum about 4,000*l.* have been raised, and applied to the thorough renovation of the nave of the church. The transepts will next occupy Mr. Scott's attention, and subsequently the chancel and other subordinate points.

Capenhurst.—The first stone of Capenhurst Church was laid on Wednesday before last, by the Rev. R. Richardson, of Capenhurst Hall. The building is to be erected at his own expense, for the accommodation of his tenantry and those of the adjoining township of Ledsham. He is also to endow the church. The church is in the Decorated style of architecture, designed by Mr. Harrison, of Chester, architect, and it is to accommodate 200 persons. Mr. J. D. Williams, of Chester, is the builder.

Manchester.—A new window, from designs by Mr. Speakman, architect, has just been inserted in the tower of St. Paul's, Higher Broughton. It has three lights, with tracery of the Early Perpendicular period. It has been filled with stained glass by Messrs. Edmundson and Son, of this city, who have been commissioned to supply a similar window for the north transept of the same church.

Maryport. — Crosscanonby Cemetery, near Maryport, was consecrated on Wednesday before last, by the Bishop of Carlisle. The ground is situated about 1¾ mile from Maryport, on the Netherhall road, in view of the sea. The soil is gravelly. It is enclosed by a red stone wall, which, on the west side of the ground, will be surmounted with a palisade. The cemetery is still in a rough state. The entrance is by an archway, on either side of which a curator's lodge, and a board-room and office, are in course of erection. On the opposite side of the ground are two chapels, one for the Church of England, and the other for Nonconformists. They are both of red stone, and in the Norman style. Each will accommodate about 100 persons. Both chapels have porched entrances, supported by three arches. The interiors are fitted up with stained wood, and are lighted by small windows of cathedral glass. At one end is an apse, or rounded projection, which in the Church of England chapel answers for the purposes of a chancel, and in the Nonconformist chapel contains the reading-desk. Each chapel is also provided with bell-turrets, in which it is intended to hang bells. They are both flagged, with the exception of the apses, which are paved with Minton's tesselated pavement. The whole has been designed by Mr. Charles Eaglesfield, of Maryport, architect, who is also about to lay out the ground. The contractors for the work were Messrs. Fraser and Brotherton, of Workington.

AN ATTEMPT TO ACCOUNT FOR THE MOON'S ROTATION.

Observing that you have recently extended your already world-wide influence, and have gone so far as to treat of the architecture of the moon, perhaps you will be induced to find space for the lucubrations of a brother architect, the mundane character of whose thoughts have been disturbed by the recent controversy on the motions of the noctural luminary.

I am not deeply read in the objections of Mr. Jelinger Symons, yet I cannot but think that the defenders of the received theory have been somewhat too positive, and, in some instances, a little superficial in their replies.

Nothing can be more obvious than that the moon's motion involves, *by implication* (if I may use the expression), a rotation upon her axis as well as a motion in an orbit; that is to say, that had she received, when launched into space, these two impulses, precisely agreeing in their periods, the result would be just what we now observe. It is equally obvious, that had she then received only a single impulse (that in her orbit), and no other cause or force interfered with the motion thus communicated, her motion would *not* have been what it now is. This the simplest experiment or the mere consideration of the laws of motion would suffice to prove.

It does not, however, follow that because a motion may be shown to be resolveable into two or more others, it is therefore actually *the result* of such motions. It may be that it is also resolveable into some quite different motions; and we should then have to choose to which we should actually attribute the result. Any ball on the earth's surface (or at least on the equator) has every twenty-four hours a motion precisely like that of the moon, and may, on the same principle, be said to rotate on its axis; but put such a ball into a hollow sphere (as, for instance, an orange into a glass globe) and the same argument will prove it not only to rotate upon its own axis, but, as it is now become a portion of the larger sphere, it will, on the same principle, rotate upon *its* axis, or on those of any number of spheres in which you may imagine it to be enclosed. In the same manner the moon may be proved to rotate upon an *infinite number of axes*,—indeed, upon any line at right angles with the plane of her orbit, provided only that that line be supposed to accompany her in her motion round the earth: and, though her own axis is the most likely one for her to choose, it is clearly somewhat arbitrary to assert, *as self-evident from the nature of her motion*, that she actually does rotate upon it.

The question, however, of most interest, is, what is the actual cause or origin of her peculiar motion? As in the rotation of the primary planets we are able to perceive an object of the very highest importance, it is natural to conclude that it was a part of the original impulse communicated to them by their Creator; but we find no exact proportion between the periods of their rotation and of their orbit, much less a precise coincidence between them. This coincidence, however, so utterly without analogy in the motions of the primary planets, seems to be the constant rule among the secondary planets or satellites, which all appear to move round their primaries, turning to them from age to age one and the same face; or, in other words, to have just the same motion round them as a ball whirled round at the end of a string.

Surely, then, this exactness of coincidence between their rotation (if it be really such) and their motion of revolution, so unlike anything else observed among celestial bodies, and, as far as we are capable of judging, unconnected with any purpose founded on utility, must be the result of some mechanical necessity common to all the satellites. My object in troubling you is, though not without some hesitation, to suggest such a cause.

Imagine the moon when first launched into space to have had but one motion—that in her orbit. She would then *apparently* have had a rotatory motion, as she would not, as now, keep one face steadily towards the earth, but would in turn present every part of her surface. Imagine her, again, to have been, as our own earth appears once to have been, and as the appearance of the moon's surface seems still more strongly to suggest, either wholly or to a considerable depth, in a *state of fusion*. The gravitation of the earth would produce on this liquid mass a tidal wave. The diameter directed towards the earth would be elongated, and as she moved in her orbit the elongated diameter would be constantly changing, producing on either side a fiery wave always following the earth, as the watery wave on our globe ever follows the moon. This wave, from the sluggishness of the matter composing it, would linger behind as our tidal wave now lingers behind the moon; and it strikes me that the attraction of the earth, ever striving to draw forward the sluggish wave to its proper place, would tend in the course of time to generate a quasi-rotatory motion in the moon herself; at first very minute, but increasing till it superseded the necessity for motion in the tidal wave, and caused the elongated diameter to be stationary, and constantly pointing towards the earth; in which position it would continue, as we now find it to exist, when at length the molten surface became solid.

Let it not be supposed that I am claiming any very enormous result for the cause I have imagined. The rotatory motion of the moon (if it be properly so called) is but a slow one after all; for while the earth at its equator moves, in its diurnal circuit, at the rate of 1,000 miles an hour, the moon's equator does not go faster than a respectable stage-coach.

If this explanation be correct, the moon's motion may or may not be said to involve a proper rotation, but, to say the least, it is a rotation of a very different kind and a very different origin from that of the primary planets. S.

DEPARTMENT OF SCIENCE AND ART.

The third report of the United Department has been published. Under the head of Geological Surveys, it shows that in Great Britain during the past year, the total field-work extends over nearly 1,700 square miles. "One sheet and fifteen quarter sheets of the trigonometrical survey, geologically coloured, have been published since the last report. These embrace an area of about 2,400 square miles, and comprise parts of the counties of Worcester, Salop, Chester, Stafford, Leicester, Nottingham, and Derby."

In the training school seventy-nine masters, in training, have attended during the last year. At the sale of the Bernal collection, 730 lots were purchased for Marlborough House. The average price amounted to 11*l.* 7s. per lot, while the average price of the entire number of lots (4,294), was 14*l.* 11s. Reference is made to the establishment of what have been called trade schools. "The object of these schools is to impart to the sons of tradesmen, artizans, workmen, and others a knowledge of those principles of science and art on which *all* trades and manufactures are founded, and to give a thorough insight into the elements of those things with which they will constantly have to deal in after-life. They do not, however, propose to have particular trades taught, or to interfere between the master and the apprentice."

The first school of this kind was organised at Wandsworth, and we find under the head "Building Trades," the following course of instruction set down:—

"1. *Builder's Drawing.*—Or, the drawing to a scale, plans, elevations, and sections of buildings.

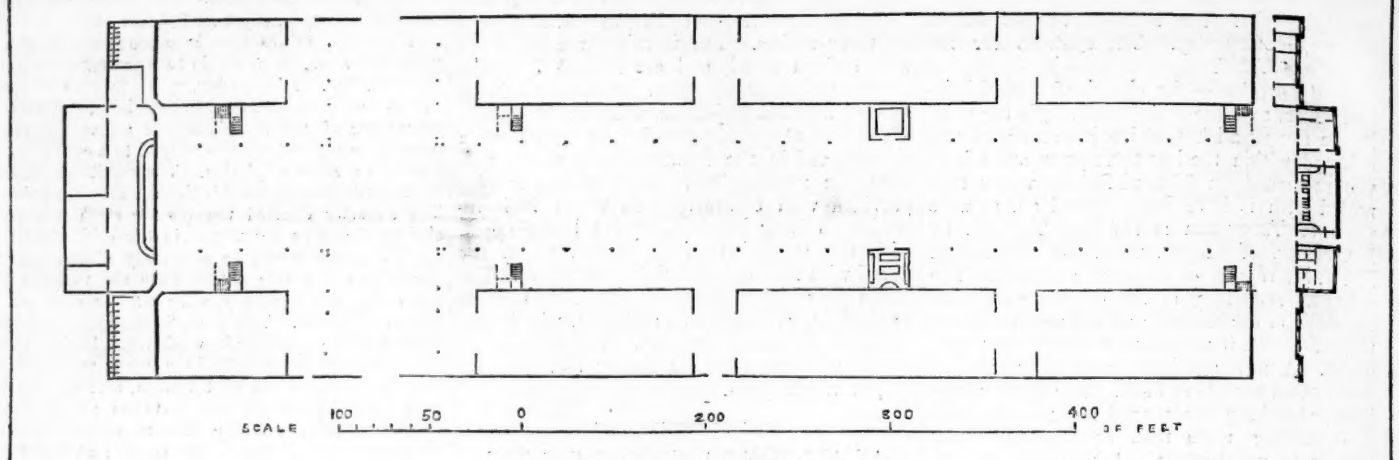
2. *Builder's Arithmetic.* — Or, the principles of making estimates for the cost of constructions and contracts.

3. *Builder's Geometry.*—Or, the measurement of the sites, the levels, the workmanship, and the materials of buildings.

4. *Builder's Mechanics.* — Or, the principles of the stability of structures, the selection, strength, and economy of materials.

5. *Builder's Natural Philosophy.* — Or, the principles of ventilation, sewerage, and heat and light, as applied to buildings."

A list of subjects for design is given, including paperhangings, pottery, and wall decoration, for which both money and medals will be awarded.



Plan of the Manchester Exhibition Building.

THE MANCHESTER EXHIBITION BUILDING.

The works for the building at Trafford, for the exhibition of "Art-Treasures," are now being proceeded with in earnest. The first pillar has, we believe, been raised, and we now lay before our readers a plan of the building and a view, showing the appearance the interior will take. The plan of the building, it may be seen, will be rectangular, 656 feet long and 200 feet broad, exclusive of a 24 feet projection at both east and west ends, which will give a total length of 704 feet. It will be divided longitudinally into a central hall, 104 feet wide, and two side halls or galleries, each 48 feet wide. The offices, refreshment-rooms, and other conveniences, will be arranged at the end, as shown upon the plan.

The second-class refreshment-rooms and offices are not shown upon the plan, as their disposition depends upon the arrangements to be made in connection with the railway accommodation.

The front will be constructed of white fire bricks, and decorated with red bricks. The railway corridor will meet the façade, and the design of this corridor will be in harmony with the front. There will be therefore a total frontage of about 600 feet. The sides of the building, which will be made of corrugated iron, will be supported by uprights of cast-iron, 8 feet apart, the corrugations running horizontally: the principals supporting the roof of the side galleries will be 12 feet apart, covered with corrugated sheets, excepting a portion of the centre, which will be of glass. The centre hall, 104 feet wide, will be divided by columns 24 feet from the sides, bearing 56 feet in the centre, which will be covered by a semicircular roof, also covered with corrugated sheets, and lighted in the centre. The whole of the roofs and walls will be lined with boarding, which will be covered with canvass and paper designed for the purpose. Galleries will extend round the west end of the building and transept, and there will be a smaller one at the east end of the building. Mr. E. Salomons is the architect; Messrs. C. D. Young and Co. the engineers and contractors.

As regards the kernel of which this is to be the shell, the prospects are said to be very satisfactory. To this, however, we shall have other opportunities of referring. Mr. John Deane is the general commissioner, and Mr. Minchin is the secretary.

The catalogue, which will be *raisonné*, is to be edited by Mr. Peter Cunningham.

THE PENNETHORNE TESTIMONIAL.

We understand that many architects have expressed their regret that they had not the opportunity to append their names to Mr. Pennethorne's testimonial. The list is not yet closed, and any of the profession can communicate to either of the subscribers on the list, or doubtless the honorary secretaries of the Institute would receive and transmit the names of those who may wish to take part in this honourable testimonial to the worth and merits of this distinguished architect.

THE LITHOTEMER, OR STONE-CUTTING MACHINE.

The great annoyance and expense caused by the repeated strikes of stone-cutters have been a serious drawback to the rapid execution of contract works. This evil has been more particularly felt in the Ordnance and Admiralty works now in course of construction at Milford-Haven, and has induced Mr. Williams, one of the contractors for Dale Point Works, to apply himself to the construction of a machine for cutting stone which shall render contractors less dependent. After several trials and experiments, he has so far matured his ideas, we are told, as to produce a machine, simple in principle, and containing the requisite power for the object desired, and has taken out a provisional protection for his invention.

The following is an outline of the plan of operation:—The stone is first fixed on a horizontal table to have its bed dressed: this is effected by cutters placed on an iron cylinder, or drum, whose axis is horizontal, and which revolves over the stone. The cutters are fixed on the drum in several series of rows, with vacant spaces between each series, so that when one series of cutters has done its work, and the vacant space is over the stone, the table on which the latter is fixed is moved forward to present a fresh surface for the next series of cutters, and so on until the bed is dressed. When both beds are finished, the stone is removed to have its face and joints dressed in a similar manner by another drum, arranged with cutters like the above, but with its axis vertical.

This machine is capable of dressing 20 superficial feet of limestone per minute, or a much larger quantity of any softer stone in the same time.

THE MODERN STRUCTURES IN THE BOTANICAL GARDEN, CARLSRUHE.

The botanical garden of Carlsruhe is one of the oldest, if not in Europe, at least in Germany. Caspar Bauhinus, the great botanist of the sixteenth century, speaks of the garden of Durlach—the former residence of the Grand Dukes of Baden, the treasures of which were subsequently transferred to Carlsruhe. When the present Regent assumed the reins of the country, he resolved to supplant all repairs by thorough new buildings, which, besides their practical adaptation, should be architectural works of art. Baudirector Hübsch, a gentleman known by theoretical and practical works, was entrusted with the erection of these structures. On the borders of the gardens of the castle stands the new greenhouse (*Orangerie-Haus*). As the orange-trees of the establishment are numerous and high grown, a large space was required. The building is 250 feet long, 50 feet broad, and of an adequate height. The side which turns towards Stephanie-street is ornamented by the principal elevation, above which rises a high cupola of glass, under which is a hall for festivals (*Festsaal*). The other part of the greenhouse is connected under a right angle with the whole remainder of the buildings, and ends at the palace, so that the passage from the palace to the end of the houses is uninterrupted, in a length of 1,400 feet. Almost in the middle of that line stands a high pavilion, through which passes the road from the botanical garden to the pleasure-grounds (*Erglische Anlagen!*) of the gardens of the palace, above which is a saloon affording a fine view over the town and gardens. A residence for the director, a palm-house, and a caldarium for exotic water-plants lie also in this line. The other portion of the building forms an arcuated gallery. In front of this gallery is a winter-garden, which forms one of the pleasantest parts of the whole. We find here trees and shrubs, which require protection during winter, but now stand quite free as in their native land. The length of this winter-garden is 400 feet by 40 feet in breadth. The great advantage of this arrangement of M. Hübsch is, that he has known how to manage things so that not even a vestige of the beams and spars of the winter protection is to be seen in summer, which was accomplished by the winter-garden having in its rear the long gallery, in the walls of which the contrivances for making the walls and roof of the winter-garden could be immitted without leaving any vestige behind when not required. The caryatides of the palm-house are made of the fine Durlach stone.

STATUE OF GENERAL SIR CHARLES NAPIER.

The hoarding which has been put up at the south-west corner of Trafalgar-square, marks the allotted site for a statue in bronze of the late General Sir Charles Napier, the cost of which has been raised by private subscription. The statue will stand nearly in a line with the vacant pedestal for an equestrian statue, and will put both sides of the square into the position of wanting completion. The statue, executed by Mr. G. C. Adams, is 12 feet 6 inches high, and has been cast in bronze at Messrs. Thompson's foundry, Pimlico. The pedestal will be 16 feet 6 inches high. The figure stands well, and the likeness is strongly marked. Simplicity and breadth characterise the treatment, and these are admirable qualities. We must, nevertheless, be permitted to say, rather with reference to works to follow than to this, that carried to extremes, especially in bronze, these qualities result in baldness and insipidity.

The Iron Trade.—An "Ironmaster," who gives a weekly account of the state of this trade in the newspapers, suggests that a reduction of 20s. might be desirable. Others are of opinion that in September there must be a considerable reduction, unless the present inactive state of the trade be very much changed. The intense heat has pretty nearly fulfilled the intent of our suggestion, that puddling should be regarded as an impracticability in hot weather. No increase of American orders as yet.

MANCHESTER EXHIBITION OF ART TREASURES.—*Mr. E. Salomons, Architect; Messrs. C. D. Young and Co. Engineers and Contractors.*

DECAY AND PRESERVATION OF STONEWORK.

A mode of efficiently hardening soft stone, and of staying from decay the various stones most commonly used amongst us for building purposes, is a desideratum of the greatest importance. The majority of our readers, doubtless, observed that, just before the close of the session, Lord Lyndhurst presented a petition from Mr. J. B. Daines, setting forth that he had patented an improved and effectual mode of preserving stone, plaster, cement, and other buildings from decay, indurating and protecting them from atmospherical influences, and neutralizing the tendency to alkaline efflorescence, the efficiency of which the authorities had declared would be decided upon in two years. He had himself seen a report from Sir C. Barry, which stated that the result of the invention, which had been tested upon 1,400 square yards of the house, had been entirely satisfactory. He desired that a committee should be appointed to inquire into the matter, but the Government thought it was too late in the session to do so.

In a letter to the *Journal* of the Society of Arts, Mr. Daines says that his attention having been awakened by an article in the *Builder* on the decay of stonework, he was led to examine the state of various stone buildings in the metropolis, especially with a view of first discovering the cause of the premature decay. He continues;—

"My experience, after a variety of tests and trials, leads me to the conclusion that alkaline efflorescence is the primary cause of the decay in stonework: this efflorescence is the result of chemical agency, not the least of which will be found in the cement or mortar employed for 'bedding' or jointing the work, as in all cases it may be observed that crystals are found commencing at the angles or joints of the work before the walls are thoroughly dry; and, in the first instance, the disintegration which follows proceeds from the alkaline matter contained in all cements and mortars now in general use. In many cases it is accelerated by the employment of sea or salt sand, which is too often used, as the damp developed on the internal walls of many of our buildings plainly testifies.

If pieces of Bath or Caen stone, an inch thick, be set with a layer of Roman cement between, and be exposed to the action of the air, it will be found, in the course of three or four years, that the cement will have so acted upon the stone as to render it capable of being crushed by pressure between the thumb and finger, in consequence of its decomposition by the chemical action of the cement. A proof of the destructive effect of salt upon stonework may be observed in any seaport town. The stone buildings which are exposed to the sea-breezes show plainly this effect. In London and large manufacturing towns the various chemical matters combined with the air form other prolific sources of decay in stonework. In certain localities, where the atmosphere is comparatively free from these influences, vegetation may be observed as accelerating the progress of decay, as instanced by the stonework of Hampton-court Palace, and the monumental work in the various cemeteries at a distance from the metropolis and large towns. Such are some of the various causes of decay in stonework.

I have endeavoured to find a remedy, and I believe that I have succeeded. I employ a solution of one part, by weight, of sublimed sulphur, in eight parts of linseed oil, heated in a sand bath to a temperature of 278 degrees Fahrenheit, by which process the vegetable mucus of the oil is precipitated, and the watery particles evaporated, and their place supplied by the sulphur, which is readily taken up by the oil at the above temperature. The solution is applied with a common painter's brush to the surface of the stone, until it will absorb no more. Sulphur is stated by ancient and modern chemists to be insoluble in water, and to suffer no change by exposure to air; and, further, it is known to be a decided foe to vegetation, and its use in bleaching is well known. For these reasons I have selected it as the basis of the indurating medium. The stone so treated becomes extremely hard, almost equal to granite, and, so far as I have been able to test its preserving qualities, a period of four years shows, not only that no decay has taken place, but time seems actually to increase its hardiness. It is simple and inexpensive in its application."

The process appears to be similar, if not the same, as that patented by Barrett, and which has been mentioned in our pages on various occasions.

PROVINCIAL NEWS.

Lynn.—The following were the tenders for construction of the quay along the Marine Parade:—Mr. W. D. Harding, Lynn, seconds timber, 3,200*l.*; best middling ditto, 3,350*l.* Mr. C. Clare, Watlington, 2,991*l.* Messrs. W. Nurse and D. Hart, Lynn, seconds timber, 2,901*l.*; best middling, ditto, 3,115*l.* 11s. Mr. James Crittle, Lynn, 3,100*l.* Mr. W. Sissons, Lynn, 3,126*l.* The tender of Messrs. Nurse and Hart for seconds timber was accepted,—the works to be completed by 25th March next, under a penalty of 20*l.* per week.

Norwich.—Thirty sets of plans have been received for the new workhouse. They have been referred to a committee for arrangement and exhibition to the local guardians and others.

Great Yarmouth. — The General Board of Health have approved the plans for the new Marine Esplanade, after suggesting certain minor modifications. Mr. Ranger, one of the inspectors to the Board, in recommending that the local authorities should be allowed to borrow 1,700*l.* on the security of the rates, for the purpose of carrying out the works, says;—"The esplanade to be made will be about 2,300 feet in length: the carriage-drive will be 26 feet. There will be two footpaths at the sides thereof: that on the eastern or sea side will be 11 feet in width; the other, near the houses, 7 feet and upwards. The drive and walks are to be supported on the seaward side by a retaining wall of concrete, 6 feet in height above the level of high-water mark, with a breast wall 2 feet in height, for a distance of about 500 feet, to stop the drifting of the sand into the houses. The retaining wall is to be coped with Yorkshire stone."

Abingdon.—The tender of Mr. J. Thomas for the erection of the new station-house for the Berks Constabulary at Abingdon, for the sum of 1,312*l.* 9s. 5d. (out of which 150*l.* is to be deducted for old materials) has been accepted.

Gloucester.—Public baths are about to be provided for Gloucester. Plans have been prepared, and it is intended to construct the building on the most approved principles. There will be first and second-class baths for ladies and gentlemen, and a swimming-bath about 70 feet long and 50 feet wide, with a fountain in the centre. The building has been designed by Messrs. Jacques, of Gloucester. The erection, however, depends on the contingency of a subscription list being filled up.

Shenstone.—The new schools erected in the village of Shenstone have been formally opened. The architect was Mr. W. Baker, and the builder, Mr. Thomas Hassall, of Shenstone.

Boston.—A new school is in course of erection near the church at Algarkirke, for the use of the Algarkirke and Fosdyke parishes, the Rev. B. Beridge being at the whole cost. The foundation-stone was laid by Mrs. Beridge. The building is progressing under the superintendence of Mr. Webster, of Wyberton; the style to correspond with the church. The building will be large, the school being in the centre, with a residence at each end for the master and mistress, with proper conveniences attached. It is to be constructed of brick, fronted with worked and chopped stone, from the Ancaster pits.

West Hartlepool.—The foundation-stone of a new bank at West Hartlepool, was laid in week before last. The building will be of brick, with stone dressings, and will be fire-proof. The plans were drawn by Messrs. Pritchard and Son, of Darlington.

South Shields.—The scheme has been revived in the South Shields Council to build a new Town-hall, in the Market-place, at an outlay of some 5,000*l.* or 6,000*l.* The funds, it is stated, will be derived from the dues and tolls collected in the market. This however, is opposed; it being argued that the surplus of the tolls collected in the market, after paying principal and interest, should be applied to improvements in that square.

Airdrie.—The foundation-stones of the Court-houses, the Market-house, and the Railway Station, of the town of Airdrie, were laid with masonic ceremonial on Thursday in week before last.

METROPOLITAN BUILDING ACT.

Decision of Magistrate that Section 13 *and the* 1*st Rule of the* 1*st Schedule were modified in the case by the Board of Works.*

Pickford, a builder, erected a one-story shop on the fore court of a dwelling-house in the Bermondsey New-road, up to the public way, to which the district surveyor objected that it was not inclosed in front with wall of brick, stone, or other hard and incombustible substances.

At the hearing of the case on Friday, 1st of August, before Mr. Secker, the magistrate sitting at the Southwark Police Court, it was shown by the district surveyor that with the exception of the brick footings and 18 inches in height of brickwork on the bressummer, no portion of front was inclosed in conformity with the 1st rule of the 1st schedule, and that the quantity of brickwork was far less than half the front, as required by section 13, which restricts any openings to half the area of the wall. He put in a tracing signed by the chairman of the Metropolitan Board of Works and the superintending architect, and a letter from the latter, informing him that the Board had sanctioned the projection of the shop under the 143rd section of the Local Management Act, which sanction the builder seemed erroneously to consider as authorizing the construction intended to be shown by the tracing. To this the builder replied that his communication from the Board of Works differed from, and went much further than that to the district surveyor,—and he read his application to the Board, mainly requesting, under the 56th section of the Building Act, their sanction to the construction of the shop-front in woodwork, as shown on the tracing put in by the district surveyor, and only in the second place asking for leave to make the projection, it being really no projection at all. He then read the reply he had received from the Board, which gave a complete sanction to all his application, without reference to any particular Act or section.

The district surveyor argued that the Board could never have intended to sanction the drawing *in toto*, as it was insufficient to explain the construction, and that a modification of express rules of the Act under section 56, would be made in a more formal manner, reference being specially made to the enabling provision of that section.

The magistrate ruled that the Act itself requires the front to be of incombustible materials, according to the 1st rule of the 1st schedule, and that section 13 restricts the openings to the extent of one-half the area of the front, which was greatly exceeded in this instance. As, however, the tracing was signed by the chairman and superintending architect, it must be looked upon as a document of authority; and from it, as well as from the application of the builder, and reply thereto, it was a fair inference of the builder that the Board allowed all the openings which were shown by the drawing. He therefore adjudged that the builder was entitled to make the doors, sashes, and frames, as shown in the drawing, though exceeding the area allowed by the special rules of the Act; but he ordered that the builder should comply, in other respects, with the requisition of the district surveyor, by building the remainder of the front of the substances mentioned in the 1st rule of the 1st schedule, within a month.

THE BRITISH ASSOCIATION.

The general meeting at Cheltenham opened on Wednesday in last week, at the Proprietary College, with a full attendance, when the Duke of Argyll resigned the presidentship to Dr. Daubeny, and the meeting was addressed by these and various other gentlemen. The meetings in the Sections on the successive days comprised a good many valuable papers, but few requiring any special notice from us. Dr. Augustus Voelcker read one "On the Corrosive Action of Smoke on Building Stones." Mr. Duncan M'Pherson gave an account of some researches in the Crimean Bosphorus, and on the site of the ancient Greek city of Pantecapæum, at Kerch, regarding which we lately gave some notes in the *Builder*. Colonel Sir H. Rawlinson lectured on the Friday evening in the College, "On the recent Discoveries in Assyria and Babylonia, with the Results of Cuneiform Research to the present time." Mr. Tite, at Bath, we may here remark, early in January of this year, in the course of reading a paper in the Guildhall of that city on these discoveries, reproduced before his auditors, in moist clay, a portion of the inscription at Ecbatana, containing the names and titles of Xerxes. Indeed, the process is so simple that any one may repeat it. The arrow-headed character is simply made up of the form of an ancient arrow-head somewhat elongated—generally moderately so, but in the Babylonian inscriptions more extravagant in that particular. If any one desirous of repeating the

experiment will take a smooth surface of moist clay and a piece of wood about three-quarters of an inch square and 3 inches long, cut square at the ends, he will find, on pressing the angular point into the clay, he can reproduce any of the characters with the most perfect facility; and if the surface of the clay be of sufficient size, he can reconstitute, as Mr. Tite did, the Hamadan inscription. It is probable that in the cylinders and tablets this impress was made by a metallic tool or style, and of course on the sculptures and rock inscriptions the original character was only imitated; but Colonel Rawlinson has shown that the impressions on the bricks found at "Ur of Chaldees" were marked with the name of a king which he thinks identical with the Chedorlaomer of Genesis, and at least 2,000 years before Christ. On the Saturday there was an excursion to Cirencester, including a visit to the Royal Agricultural College there, and the Roman remains discovered at Cirencester. On Monday business was resumed, with a good attendance, still, in the sectional departments. Amongst the papers read was one by Mr. P. J. Worsley, "On a New Process for Making and Melting Steel;" another by Mr. W. Bessemer, "On the Manufacture of Iron and Steel without Fuel;" and another by Dr. Greene, "On a Method of uniting Iron with Iron, and other Metals, without welding," invented by M. Sisco, of Paris. Mr. Baker, the founder of the Hardwicke Reformatory, also read a paper "On Economic Science and Statistics;" and in the evening Mr. Grove discoursed "On the Correlation of Physical Forces."

METROPOLITAN BOARD OF WORKS.

The Board met in the Council Chamber, Guildhall, on the 12th inst. to consider a report from the engineer of the Board on the extension of the main outfall sewer on the southern side of the River Thames to a point in Long Reach, below Erith. The engineer said in his report;—

"I recommend the construction of a sewer, 10 feet 6 inches in diameter, 7¼ miles in length, and with a fall of 2 feet per mile, commencing in the Plumstead-road, at the east end of Woolwich Arsenal, where it forms a junction with the main outfall sewer, which was adopted by the Board on the 26th May last. The extension line continues thence along the north side of the North Kent Railway, through Erith, under the river Darent, to the Thames at Little Powder Creek, which is about the centre of Long Reach, one mile below Purfleet, two miles above Greenhithe, and nineteen miles below London-bridge."

"I recommend that for eleven months in the year the discharge of the sewage into the river should take place at high water, and during the first half of the ebb-tide, and that for the remaining twenty or thirty days of heavy rain, the discharge of the then diluted sewage should also take place one or two hours before high water, by which means a reduction of the size of the covered reservoir from 15 acres to 4 acres might be effected, and an increase of its depth obtained, so that it would contain about 2½ million cubic feet."

"The foregoing instructions, however, direct the preparation of a plan for the discharge of the sewage at, and after high water only. I therefore beg to report, so sudden and unequal are the quantities of rain that fall, that to avoid the discharge of the sewage before high water on the twenty or thirty wet days per annum, would necessitate the construction of a reservoir of double the size now proposed at an increased estimated cost of about 40,000*l*."

"My estimate of the proposed extension to Long Reach is	£207,620
Less the cost of the sewer and reservoir across Plumstead Marshes	114,580
	£183,040
This added to the estimate of the southern drainage	831,696
Gives a total of	£1,014,736

The chairman said he should like to make a suggestion to the Board with reference to the subject before them. He said the engineer was of opinion that by lowering the sewer on the south side of the Thames, that by increasing the sewage it would take into the Thames, and in forming junctions as the case might be, it would enable him to proceed, as the Board might direct, farther down the river with the sewage of the whole metropolis *in one line*. The question arose whether it was not worth the consideration of that Board to provide the Board with some information as to the cost of carrying the sewage down to the northern district, and getting rid of a pumping station at Deptford Creek, crossing it by one line underneath the Thames; whether that information should not be before the Board while they were discussing the question of where the point of discharge should be. There was one other point which the engineer had repeatedly made, namely, that he felt a difficulty in taking in the western area on the northern side; the engineer thought that the upper towns would go upon the principle of deodorising, and that there would be an advantage in cutting off the western district.

After more than four hours' talk, the greater part of it worse than useless, the whole question of the drainage of the metropolis was referred back to the engineer.

The engineer said, in reply to questions, that he had already advised what he believed to be the best plan, but he could place before them other proposals, and the Board could then decide between them.

Mr. Nicholay presented a memorial from Mr. J. R. M'Clean, setting forth a scheme for conveying the sewage of the metropolis to a point on the lee shore of Essex, between the estuaries of the Crouch and Blackwater Rivers, and for the utilization of the same as manure, and effectually to cause the purification of the Thames.

The consideration of it was deferred.

MEMORIAL OF THE GREAT EXHIBITION OF 1851.

I addressed a communication to you on the above subject some time since, complaining, that although funds had been collected for its purpose years ago, nothing had yet been done; and in consequence, I am gratified at length to learn, through the columns of the *Daily News*, that "the money subscribed for a memorial of the Great Exhibition *is* to be devoted to the purpose for which it was subscribed;" and I further notice, that two gentlemen known to the public, and who are named, have consented to act as honorary secretaries. This certainly looks like business, and holds out somewhat solid hopes that the "consummation devoutly to be wished" will now shortly be carried out.

Nothing, I am somewhat disappointed to perceive, is definitely stated as to the *locale* of the memorial, although this is an all-important feature in the matter. The spot, in Hyde-park, on which the Great Exhibition itself stood, is the only appropriate one to embody the sentiment given birth to in the movement, as well as satisfy the requirements of the subscribers. Pray advocate this in your own language, at an early opportunity, otherwise I have some misgivings that the monster "red tape" may even now take some pains to raise objection to its being placed there. Member of the Society of Arts.

*** Beyond the resuscitation of the committee, and the enlistment of two honorary secretaries, anxious that the money raised should be applied to the advantage of *art*, nothing has yet been done. The first steps taken will doubtless be to obtain if possible permission to erect the memorial on the site of the Exhibition building.

GILDING ON GLASS.

In reply to your correspondent, glass may be prepared to receive any coating, metallic or otherwise, by etching out the parts intended to be coated with hydrofluoric acid. The commercial solution of the acid may be used for the purpose, or its vapour may be evolved from a mixture of fluor-spar and concentrated sulphuric acid by the aid of heat.

In either case, those portions of the vitreous surface *not* intended to be corroded must be protected from the action of the acid by a film of some resinous substance—such as caoutchouc, from its solution in benzole, or bees-wax to which has been added a little ordinary colophony or resin.

The slightly roughened surface produced by hydrofluoric acid on glass affords a good hold for metallic depositions. Wentworth L. Scott.

SANDERSON'S PROCESS FOR REFINING IRON.

The objects of this process are—1. To reduce the loss of metal, and to use coal as fuel instead of coke.—2. To effect a uniform decarbonisation of the pig-iron without the aid of blast.—3. To use a chemical reagent capable of giving out oxygen during its decomposition, which taking up and uniting with the carbon evolved from the metal produces carbonic oxide gas, which acting upon the earthy compounds contained in the pig-iron precipitates the metal contained in them.—4. To effect a greater facility, and also to produce a greater economy in the cost of manufacturing refined metal, by decarbonising it, and at the same time clearing away the unreduced or earthy matter with which pig-iron necessarily becomes mixed during its descent through the blast-furnace; and, further, to effect an economy (by using a purer metal so obtained) in the manufacture of malleable iron, causing less waste in puddling, and also in the subsequent re-heating required for producing bar, rod, or sheet iron. In reference to this process the *Mining Journal* says,—"The inventor appears to have succeeded in effectually accomplishing that which Karsten and others have pronounced as impracticable. He has left unnoticed in his specification all the various plans which have been patented for the use of chemical re-agents in the puddling furnace; but when the iron is in a fluid state he uses certain re-agents, which are of such a nature as to fulfil the object specified: he purifies the metal, and frees it from its deleterious matter, and at this stage he runs it out into a mould, thus taking advantage of its fluidity to separate the scoria from the metal. Instead of charging common pig-iron into the puddling furnace, and producing from it malleable iron, which is largely amalgamated with those deleterious substances which such pig-iron contains, Mr. Sanderson uses this refined metal as a raw material, which, being perfectly pure, produces a tougher, stronger, and cleaner iron than that usually made, and that also with greater economy, since the waste of metal during the processes of manufacture is less when a pure metal is used instead of an impure one. We have obtained a small sample of this refined metal, and shall be glad to show it to any one, particularly those who are engaged in this great staple of our empire. We are informed that the cost of producing this metal does not exceed 6s. to 7s. per ton, including the royalty, and that the furnace used by the inventor will refine the crude iron as quickly as the blast furnace can produce it. No blast is used; no coke: the waste in refining is not one-fourth of that experienced upon the old plan."

Notices of Books.

The Lost Solar System of the Ancients Discovered. By John Wilson. In two volumes. Longman and Co. London. 1856.

The title of this book gives not the slightest idea of the true nature of its contents. Curiosities of architecture and engineering throughout the world in all ages, but especially in ancient times, and connected with religious observances, make up the most of its contents. These are strung together occasionally by means of a weak and loose thread of most fanciful speculation, in an algebraic form, according to which ancient pyramids, towers, teocallis, pagodas, temples, obelisks, &c. were built to represent the laws of gravitation, the distances between the earth and the moon and the sun and the earth, the earth's circumference, &c.: no amount of measurement appears to have come wrong to the industrious author: if the sum of all the measurements of a building do not amount to the precise distance between the earth and the moon, or to the exact circumference of the earth itself, they form ⅛th or ⅓rds, or $\frac{1}{15}$th, $\frac{1}{18}$th, or any other fractional portion of the whole amount. Perhaps there may be some little vestige of truth in this wild speculation, as for instance, where the author endeavours to prove the Egyptian obelisk to represent in its tapering form the law of increasing force, according to which bodies fall to the earth in successive moments, but such a fabric as he has reared, on premises so fanciful and vague, surely never before appeared in print. And yet, the author is by no means original in his idea that the religions of ancient heathen nations were closely connected with astronomy. It is long since such ideas were first maintained; indeed, even ancient authors as well as modern, at a loss to explain the meaning of the mysteries practised amongst the Chaldeans, Egyptians, Greeks, &c. have adopted the astronomical theory,—if it may be so called; and the "sun" worshippers of the far east, as well as those of the far west,—those of America as well as those of Asia,—gave, perhaps, quite sufficient occasion in their outward observances for such a belief; but their higher initiations told another tale. The "sun" of these mysteries was no less an inward and a spiritual light than the "sun of righteousness" himself, whom, indeed, these secret rites, heathen though they were, distinctly *represented*. To suppose that the "heaven," and the "heavenly host," who were anciently worshipped, were no other than the outward stars and planets, sun and moon, was to ignore all those records of secret doctrine which have been handed down to us, and which clearly show that the "heaven" to which the eyes of the initiated worshippers, even amongst the heathen, were turned, was no more "outward" than the "heaven" of the Bible which is "within" the human organism,—as much so, indeed, as is the "sun" which is to "arise upon" that organism, to shine within it, and to make it a luminous and "glorious body," "full of light as when the bright shining of a candle giveth *us* light."

The author of the singular book now under notice, takes the Tower of Belus as the grand archetype of all other "high places" through-

out the earth, and he shows a strong analogy between that tower and many other structures devoted to religious observances, both in the "old" world and the "new." The tower and temple of Belus or Baal, according to Herodotus, who saw it while at Babylon, stood in the holy place dedicated to Jupiter Belus, on one of the banks of the Euphrates, where the city stood. The tower consisted of eight towers, one within and above another, with a winding staircase to the top, and a lodge and seats midway up,—for temporary rest or repose, as it would seem, by the way. On the topmost tower was a chapel, and in the chapel a golden table near to an elegant bed on which *by night* reposed a woman, chosen by the god Bel, or, in fact, as it may be truthfully explained, in whom, as in an oracle, "the god" appeared, in this his temple, "house," or chapel; for similar edifices, on the analogous Mexican teocallis, are known to have been called "the house of the god." Diodorus Siculus states that the temple at the summit of the tower of Baal or Belus, had an altar, but in all probability this altar may have been the bed described by Herodotus, if not the golden table. Diodorus also speaks of three statues, which he named Jupiter, Juno, and Rhea; but Herodotus saw no statues, although he speaks of the "chosen" woman, or priestess, who reposed on the bed or couch. Strabo describes the tower of Bel as a pyramid, one stadium in height, and one stadium in breadth at base. The pyramid or tower of Babel is also described as having been a tomb as well as a temple.

Now Diodorus certainly reports that the temple at Babylon served the Chaldeans as an observatory, and Pliny remarks that Belus was regarded as the inventor of astronomy; but let us see whether it be at all likely that the pursuit of astronomical science, or the worship of "the heavenly host," physically and literally speaking, was the chief purpose of the erection of such a structure. In the first place, we know from Scripture that the main purpose of the erection of the original tower of Babylon was an attempt thus to reach "heaven." Taking the word heaven in its literal and not in its scriptural sense, how was the repose of a woman on an elegant bed likely to promote either the observation of the stars, or the upward progress towards the firmament itself? The idea is too gross and absurd to be for a moment credited in the face of such an account of the tower at Babylon as Herodotus has given. That account, however, is in perfect accordance with an endeavour to reach that inward "heaven" of ecstatic repose and "divine absorption" which to this day constitutes the earnest desire of such eastern devotees as those of India and China. And that the doctrines of other ancient and wide-spread religionists partook of such aspirations after heavenly rest and perfection, and aimed at the realization of them by just such means as those betrayed in the paraphernalia of the little temple, chapel, or "house of the god" at Babylon, could be here easily and fully shown were this a fitting place for the proof. An instance or two, however, may be adduced. As respects the Druidical religion, which at one time prevailed over vast tracts of the earth's surface, Davies thus translates the account which Taliesin, a Druidical noviciate, gives of his probation: "I was first *modelled* in the form of a *pure man* in the hall of Ceridwin, who subjected me to penance. Though small *within my ark*, and modest in my deportment, *I was great. A sanctuary* carried me above the surface of the earth. Whilst I was enclosed within its ribs, *the sweet Awen rendered me complete.*" Davies thence infers that the Kist-vaen (such as Kit's Cotty-house in Kent) was very probably the *ark* here referred to: the kist-vaen, like other Druidical monuments, is found in parts of the world widely separated. There is said to be one on the banks of the Jordan which resembles Kit's Cotty.

In "Scenes and Impressions of Egypt," the author, while on a visit to the Temple of Dendera, and in allusion to affinities between the Hindoo and the Egyptian worship, says,—"While on the staircase, the priest and the sacred *ark* must have reminded him, and strongly, of the Brahmins *and the palanquin litter* of his native country,"—a remark which, as we shall now endeavour to show, all at once transports us from the ancient and obsolete worship of the Egyptians, Druids, and Chaldeans, to the extant,—living worship of the Chinese at this very day.

In the *Morning Herald*, of 23rd or 24th September, 1854, is a curious article on the religious tenets of the Chinese insurgents, in the shape of a translation, by the well-known Chinese scholar and missionary, Mr. W. H. Medhurst, of an official statement made under the authority of the Celestial and other "kings" of the revolution. From this official document we shall make but a single extract, illustrating its meaning by help of a note by the translator.

"The servant said, 'The eastern prince is enjoying *repose* in the *sedan*, and I do not dare to disturb him.' The chamberlain of the northern palace hearing that the eastern prince was enjoying repose, did not presume to repeat the inquiry, but hastened back to inform the northern prince. The northern prince hearing that the eastern prince was enjoying repose, hastily descended from his sedan, and proceeded on foot to the middle of the road, where he *knelt* down and *inquired*, saying,—'Has the *Heavenly Father* troubled himself to *come down to this world* again?' To which the Heavenly Father replied in the affirmative, telling the northern prince to convey the sedan into the *Hall* of *Audience*. The northern prince replied, 'I will obey the injunctions of the Heavenly Father;' whereupon he hastily commanded the female officers of the court to inform the Celestial King of the circumstance; which done, he, together with the ministers of state and the other officers, conveyed the sedan of the eastern prince within the gates of the palace. The Celestial King, Thae-ping-wang, having heard the message which the female officers brought from the northern prince, intimating that the Heavenly Father had taken the trouble to come down into the world, hastily went on foot to the second gate of the palace to receive the Heavenly Father [who had thus *appeared* in the body of the *reposing* inferior of the "Celestial King"]. The last-named [the Heavenly Father], on his arrival, was angry with the Celestial King, saying, Sew-tseuen! You are very much in fault: are you aware of it? The Celestial King, kneeling down with the northern prince and all the officers, replied, saying, 'Your unworthy son knows that he is in fault, and begs the Heavenly Father graciously to forgive him.'"

In order to enlighten the West on the subject of this strange proceeding in the East, Mr. Medhurst says,—

"There is here some need of explanation in order to assist the general reader to understand the subject. The eastern prince, it appears, had seated himself in his sedan, and was about to proceed to the court of Thae-ping-wang, when it was said, all of a sudden, that he *was enjoying repose, which means, that he had fallen into a* TRANCE. While in that state it is pretended that the Heavenly Father had taken possession of his body, and, without the individual affected being conscious of the fact, he says and does things which are supposed to be the sayings and doings of the Heavenly Father. The northern prince seems to have been aware of the supposed possession as soon as he heard of the *repose* of the eastern prince, and therefore alighted from his chair, knelt down in the middle of the road, and asked if the Heavenly Father had *come down*. The colloquy that ensued was between the eastern prince—personating the Heavenly Father—and the northern prince (and Celestial King). The trance over, exhaustion succeeded, and the eastern prince was informed of what had happened, of which he himself pretended to be unconscious. *Such pretended possessions are common in China.*"

They are also common to this day in India, and not uncommon even amongst the native Americans. Now, whether this be all imposture, delusion, or truth, is a matter of not the slightest importance, so far as regards the object we have in view, which is, to shed some new light on the true meaning and the actual purposes of those ancient structures devoted to religious or to quasi-religious observances, more especially in ancient times. Indeed, that object is better served on the hypothesis that it is delusion than on that which implies its truthfulness. Let us at once take for granted that all such practices were a delusive similitude only of the truth as regards divine possession: still in these delusive practices we find the true key to all the mysteries of magical and heathen temple rites. The *bed* in the chapel of the tower of Baal at Babylon was, like the sedan or palanquin of the eastern prince, the place in which the entrancement of the chosen tabernacle, or body, of the oracle, took place. That chosen one was often a female, as in the Theban and the Delphian Oracles, as well as in the Oracle at Babylon. Iamblichus, while treating of the Egyptian invocation of the God in him who "reposes on the "beautiful couch" (as in the "elegant bed" at Babylon), says that, in uttering the invocation, the invoker [on the couch] "became, as it were, a divine person," or a God. This is in perfect accordance with the Chinese idea as illustrated by Mr. Medhurst.

The practice of entrancement in China, referred to by this gentleman, is a practice closely connected with the Buddhist religion which *comprises a full half of the whole human race*, and is hence well worthy of serious investigation and consideration with reference to their temple worship, especially when we recollect that even the Apostles of the Christian religion, "as they prayed *in the temple, fell into many trances.*" The Buddhist practice of entrancement responds to, and is identical with, the absorbed state of the Brahminical religion or philosophy of India, and with the enchantments practised in the temples of the Magi, in Chaldea, and also in Egypt, where there were dark temple chambers devoted to the sanitary "temple sleep" of the Egyptian Æsculapius. The Brahminical state of entrancement is held, by "the enlightened twice-born," or Brahmins, to be a third and separate state, of unworldly or spiritual existence, co-ordinate and co-equal with, though in these times rarer than, the two ordinary states of waking and sleep, and is regarded by them as an awful state of death or of self-annihilation and "absorption" into "the divine abyss," a metamorphosis effected, like the spiritual marriage of the Rosicrucians, by the exercise of fasting, watching, prayer, and contemplative abstraction, as taught even by Plato and Plotinus in ancient times, and as practised, or pretended or supposed to be practised, as well as preached, by the living generation of Brahmins and Fakers in India; constituting, in fact, the very same thing as those desired and anxiously prayed for flights of the "winged" soul to "heaven" (in the nightly "repose" of entrancement or ecstatic "rest" *in* the veiled "glory" of the Isiac "midnight sun"), the *restitution* of which the ancient Egyptian hierophants explicitly declared to be the grand object and end of their religion; so that to suppose anything connected with the mere astronomy of the outward heavens to have been the actual subject of religious worship or observance in ancient times and temples, is expressly to contradict the evidence of tradition so far as regards the Egyptians. There are even modern magi in Egypt who, like the Chinese, still evoke the state of entrancement, especially in youths, by help of fumigations with incense and other processes, for the purpose also of causing them to see visions or have optical illusions, as Mr. Lane narrates in his work on the modern Egyptians; and the same thing occurs in India, and also in Thibet and Tartary amongst the Buddhist Llamas, priests, or monks.

It is by pursuing the hints here thrown out to their vast and comprehensive issue, and not by fanciful astronomical theories, measurements, and calculations, that the real objects, purposes, and significations of the *imposing* and *astonishing* structures of ancient engineering and architectural science and skill throughout the world will be elucidated; and to that end the work now before us is highly capable of contributing, notwithstanding the ill-spun and fragile thread of astronomical hypothesis which pervades it; for it contains an extensive collection of curious detail totally unconnected with any such hypothesis,—ill-arranged certainly, but of decided value to every one interested in the Cyclopean and other works of extreme antiquity, and in the magical and other doctrines with which these great works were really connected.

FATAL ACCIDENT AT EDINBURGH.—In demolishing the tenement in Leith Wynd, the gable of which lately fell down, several persons have been killed and others severely injured by the fall of the front wall. A woman and two children were also seriously injured in the house opposite, which was partly knocked down by the fall of the ruin.

Miscellanea.

Fire at Messrs. Broadwood's Factory.—A disastrous fire occurred on the 12th inst. at the Piano-forte Factory of Messrs. Broadwood. The origin of it is unknown, but in an establishment where so much polishing work must go on, and hence so much oil, and cotton, turpentine, &c. must exist in mutual contact, even spontaneous inflammation may have caused it. Several hundred workmen will be thrown out of employment, and a great number have lost their tools, some of which were insured, but many not. It is much to be regretted that workmen will not adopt this easy mode of securing the value of their property. There is no difficulty whatever in doing so. It is a practice we have often urged, and we hope that experience, such as the present, will at length induce the general observance of tool insurance as a rule with but few exceptions.

Wolverhampton School of Practical Art.—The annual meeting in connection with this Institution, was held on Monday before last. The walls were covered with the drawings of the pupils in various stages of progress. A considerable number of the drawings shown represented parts of the human figure and architectural ornaments drawn from casts, Mr. R. Kettle, one of the vice-presidents, took the chair, in the absence of Lord Hatherton, the president of the Institution. The secretary read the report, which stated that the evening classes numbered sixteen less pupils than at the same time last year, partly owing to the establishment of a class at the Free Grammar School, conducted by Mr. Chittenden, the master of the school of art. The day classes had considerably increased in numbers, and the aggregate fees had been increased from 162*l.* 10s. 9d. in 1855 to 170*l.* 9s. in the year now terminated. Eighteen pupil teachers connected with the various parochial schools of the town and neighbourhood were under training in the school, and were admitted for half the usual fees. The annual subscriptions were 17*l.* less, which was attributed to the pressure of national and local taxation. An effort had been made to relieve the Institution from debt, and nearly 700*l.* had been contributed. There still remained, however, 450*l.* to be paid off. After some other proceedings, the prizes were distributed by the chairman.

Electro-telegraphic Progress.—The Hughes Printing Telegraph Instrument, says the *New York Commercial Register*, is now finished, and will be placed upon the line between this city and Philadelphia. This invention, it adds, may be called a printing-press and telegraph instrument combined, for it prints all messages in plain Roman capitals, with unerring correctness, and at an almost incredible rate of speed, averaging in the ordinary despatch of business from 20,000 to 25,000 letters per hour. It also demonstrates the practicability of sending and receiving messages in opposite directions over the same wire at the same time.——It now seems really probable that the scheme for uniting America and Europe by means of the electric telegraph may very shortly be realized. The *New York Times* of 8th July states that a small steamer, the *Arctic*, had left that port to take soundings preparatory to laying the submarine cable from Newfoundland to Valencia Bay, on the western coast of Ireland. Between these two points the bed of the ocean rises in a long level plateau, running east and west, of considerable width, and composed of sand and shells, presenting a remarkably level surface. Lieutenant Maury calls it the telegraphic plateau.——It was found the other day, according to the *Dumfries Courier*, that the wires of the magnetic telegraph betwixt Carlisle and Dumfries would not work properly, and an examination of the line having been made, it was discovered that near Gretna, where a portion of the iron tube in which the wires are enclosed is not covered with earth, the great heat had warmed the metal to such a degree as to soften the gutta-percha which encased the wires, and these coming in contact with each other the magnetic current was broken. It is supposed that other parts of the line have been similarly affected.

Sanitary Improvement in the City.—It is gratifying to observe, that those blots on the fair fame of the metropolis in its courts and alleys, to which years since we pointed attention, both in the *Builder* and in "London Shadows," are gradually being erased by the City authorities. The state of Fox and Knott-court, for instance, has just formed the subject of a portion of one of the City officer of health's reports to the City Sewers Commission. This court, it appears, has at length been thoroughly inspected, and orders have been issued for "such improvements as the place will admit of." The short supply of water is specially referred to, and the necessity of remedying this admitted as very urgent. The whole court, adds Dr. Letheby, must, from its dilapidated state, ere long be brought under the notice of the surveyor. Progress is also being made towards the amendment of other courts and alleys.

Lowestoft *v.* Yarmouth.—At Ipswich, before Mr. Justice Coleridge, the case of Preston *v.* the Norfolk and the Eastern Counties Railway Companies came on upon 30th ult. This was an action brought by the commissioners of Yarmouth harbour in the name of their clerk, pursuant to the direction of the Master of the Rolls, in which the plaintiff complained that the defendants had wrongfully diverted and abstracted the waters of the rivers Yare, Wensum, and Waveney, which of right ought to flow into and through Yarmouth harbour, and had turned the same into Lake Lothing, and thence into the sea, through Lowestoft harbour. From the opening statement of council for the plaintiff, it appeared that plaintiff filed a bill in Chancery to compel the reparation of the locks, and to restrain the defendants from diverting any of the waters of the rivers for the supply of the cut between Lake Lothing and the sea, which they advanced a right to do under their Acts. The Master of the Rolls held that the defendants were bound to repair the locks as a public duty, and he ordered them so to do. He, however, expressed an opinion that they were entitled to take some water through them for the supply of all the cuts, including that into the sea, but did not define the quantity, leaving the plaintiff to bring such action at law as he might be advised, for ascertaining the precise rights of the parties in this matter, and the exact damage, if any, done by default of the defendants. Hence this action, in answer to which the defendants pleaded separately—1. Not guilty. 2. That the plaintiff was not entitled to the waters in question. 3. A justification under the Norwich and Lowestoft Act—each company alleging in its plea that the acts complained of by the plaintiff were done by them as the servants of and under the orders of the other. After much discussion, the terms of a reference to Mr. Biggs Andrews, Q.C. were arranged, the defendants undertaking to repair the locks at once, and to proceed speedily, the plaintiff being let in to complain of acts of omission, as well as of commission, on the part of the defendants. A verdict was then taken for the plaintiff, subject to the special case.

Institution of Mechanical Engineers.—The general meeting of the members of this Institution was held on Wednesday in last week, at the house of the Institution, in Birmingham, Mr. S. Lloyd, in the chair; when the secretary, having read the minutes of the previous meeting, and a number of new members having been elected, a paper was read "On the application of Steam-power to Agricultural Purposes," by Mr. William Waller, of Lincoln. The next paper was a description of a "Double Traversing Drilling Machine," by Mr. Thomas Forsyth, of Manchester. The last paper was on an improved "Water Meter," by Mr. O. William Semens, of London, and was a supplement to a previous paper on the subject. The chairman then announced that the next meeting of the Institution would be a special meeting in Glasgow, in the middle of September, which it was contemplated to continue periodically.

Church struck by Lightning.—During a thunder storm on Thursday week, the lightning struck the tower of Holy Trinity Church, in Stretford New-road, Hulme, Manchester. It fractured one of the pinnacles on the top of the steeple, large pieces of which fell through the roof of the tower in two places, and through the church ceiling into the church below. The whole of the pinnacle was shaken down to the roof of the tower, and several pieces of stones were hurled into the road. The damage is being repaired by Messrs. Eastwood and Son, builders. The cost will be about 20*l.* There is no lightning conductor to the church, and this is generally the case where such accidents happen, as we have often pointed out; and even where a conductor may exist, there is usually something defective in it under such circumstances. Surely a conductor will now be put up at the church-under notice.

South Shields Burial Ground Competition.—Some competitors complain that, having submitted designs for the South Shields Burial Ground, and the first premium having been awarded long since, they have not been able to obtain information as to the second premium, and when the drawings would be returned.

Sale of Land.—An allotment of nineteen leased plots on the Roundhill-park Estate, Brighton, took place on Thursday, the 7th inst. at the offices of the Conservative Land Society. The plots are leased at the yearly rents of 7*l.* each for four of the plots, and 10*l.* 10s. each for the remaining fifteen plots, for the term of ninety-nine years; and the prices fixed were 84*l.* each for the former and 126*l.* for the latter. The competition was animated, and the whole of the leased plots were taken by members holding rights of choice within the first 100 numbers on the register; 20*l.* premium for each right, it is said, being paid in many instances. Other plots were sold on the St. Margaret's Richmond, Maldon South Essex, and Woodbury-park, Tunbridge Wells, West Kent, estates.

Norwich Free Library.—We have received some printed comments on this building of a not very flattering description, put forth as the "Observations of an Architect." These serve to show that the building must be of an odd character, but are couched in such strange language as to forbid much faith in the dictum of the writer. Take a specimen:—"In the first place, the Antea being raised upon a brick plinth instead of a wrought stone Podiam and Stylobata, and the Antea being greatly and disproportionately diminished from one-third of its height upwards to the cap in front; and the same in the profile, which not only conveys deformity in effect, but is contrary to the practice shown in any specimen of legitimate architecture. And the stone entablature (viz. the architrave and frieze), are sunk in the red brick wall without any projection, whereby it conveys no idea of support from the Antea, and is, therefore, contrary to every prevenient example. And the corona of the cornice is of an extravagant and disproportionate projection,—and the chambranle, or stone margin, which surrounds three sides of the apertures, are too trifling and diminutive to produce their proper effect,—and the sagitta, or keystones of the arches, are wrought vermicular on the face, a practice in the present date entirely exploded and obsolete with professional architects, and never was at all in character with any of the orders of architecture, but is supervacaneous and form an entire anomaly therewith; and sinking of the stone subsills on the face, which always appear as solids, is contrary to all precedence in existence."

Wiltshire Archæological Society.—The annual *réunion* of the members of this society commenced on Tuesday in last week, at Warminster, and was attended by a large number of the archæologists of the county. The public proceedings commenced at one o'clock, by the general meeting of the members in the Town Hall. In the absence of the Marquis of Bath, the president of the society, the chair was taken by the Rev. Prebendary Fane, Vicar of Warminster. The chairman, in opening the proceedings, explained the objects of the society. Mr. Lucas then read the council's report for the year, which stated that there was little to add to the last year's report. Mr. Sydney Herbert was elected president of the society. The Rev. J. O. Picton then delivered an address on archæology, and the members adjourned to the National School-room, where a dinner was provided for the party, which filled the large room. In the evening a *conversazione* was held in the Town-hall, in the course of which papers were read, and next day the members of the society were to assemble at the Town-hall, at ten o'clock, when the Rev. J. Wilkinson was to read a report "On a Scheme for the Parochial History of Wilts, with Notices of Broughton Gifford;" after which (by permission of Mr. Temple), an excursion was to proceed to Battlesbury and Scratchbury, under the direction of the Rev. J. Baron; and an excursion to Longleat was also to take place, visiting first Clay-hill, and proceeding thence, by way of Prospect-gate, to the Marquis of Bath's mansion, at which the members and subscribers were to be received by the president. A paper, "On Longleat," was to be read by the Rev. Canon Jackson, secretary, after luncheon. On the return route to Warminster, Woodhouse Castle (of which Mr. Wansey was to read a brief notice on the spot), and Horningsham church, were to be visited.

Greenwich and Deptford.—The sanitary state of Greenwich and Deptford appears to be very bad. At a late meeting of the District Board of Works, the medical officer presented a report as to the condition of the poor inhabitants of the locality. It appeared that at Griffin-street, Deptford, where the cholera raged fearfully in 1854, the houses are occupied by six or seven families in each, and that in one house four deaths had taken place from typhus fever; also that one of the City missionaries who visited the house caught the disease and died. At Greenwich, in the eastern district, seventy-six houses derived their supply of water from tubs sunk in the marshes, the water in them mixed with the contents of stables and cesspools. It was resolved that the owners of these houses should provide a proper water supply, and the state of Griffin-street, Deptford, was referred to a committee.

Protection of Metallic and other Surfaces.—Mr. G. E. Cook, of Greenock, has invented a composition for protecting exposed surfaces, or surfaces liable to oxidation, deterioration, or decay, and which is said to be applicable to all kinds of ironwork, brickwork, stonework, plasterwork, Roman cement, and, amongst other things, to mirrors or silvered glasses. In making up this composition, from two to six pounds of gum shellac are dissolved in every gallon of methylated spirit; or, instead of methylated, wood spirit may be used. The dissolved gum may then be mixed with any suitable colouring matter, and is to be applied to the surface to be protected like ordinary paint or varnish.

British Archæological Association. — The proceedings of the Congress to be held at Bridgewater, on the 25th, will be opened with a public meeting in the Town-hall. Introductory Sketch of the Antiquities of Somersetshire, by Mr. Pettigrew. —Examination of Churches, &c. — Evening Meeting at the Town-hall, for papers, and on each following evening.—On the 26th, Visit to Glastonbury Abbey, Church, Abbot's Kitchen, the George Inn, &c.—Wells Cathedral, Close, Palace, St. Cuthbert's Church, &c.—27th. Visit to Martock — Stoke-sub-Hamdon—Stoke Church—Hamdon-hill—Montacute, remains of the Cluniac Monastery—The Church—Brympton Church—Yeovil Church.—28th. Visit to Clevedon Church, Walton Castle and Church, Weston in Gordano Church, Canenor Court, Clapton in Gordano Church, Cadbury Camp, Tickenham Church, Clevedon Court. On the 29th they go to Bath. Reception at the Bath Royal Literary Institution—Examination of various Churches—Conversazione; and on the 30th, there will be an Excursion to Hampton Down, Belgic Settlement—Bath-Hampton Church—Batheaston Church—Langridge Church—Waller's Entrenchments—The Camps—Chapel on Lansdown, with the closing meeting.

The Bell for the New Palace at Westminster.—On the 6th instant, the great bell for the Clock-tower of the New Palace at Westminster was cast at Messrs. Warners, Lucas, and Barrett's furnaces, at Norton, near Stockton-on-Tees. The mould had been in course of preparation for the previous six weeks, and two reverberatory furnaces, capable of melting 10 tons of metal each, had been built expressly for the purpose of casting this monster bell. The furnaces having attained the requisite heat, their doors were opened, and the operation of charging, or putting in the metal, commenced, occupying about one hour, and, in less than two-and-a-half hours, the whole of the metal required (18 tons) was in a state of fusion. On the signal being given, the furnaces were tapped, and the metal flowed from them into a pool prepared to hold it, before being admitted into the bell-mould: the shutter or gate was then lifted, and the metal allowed to flow, which in five minutes completed the casting of the bell.

Monumental Window at the Army and Navy Club.—A memorial window, in commemoration of officers who have fallen in different battles, is about to be erected on the principal staircase of the Army and Navy Club, Pall-mall. The window will be composed of the "Brilliant-cut Glass," invented by Messrs. Mark Bowden and Co. of Bristol, to which firm the manufacture has been entrusted. It will be in the Venetian-Italian style, and will exhibit a number of tablets bearing the arms of the club and the names and dates of the engagements. The architraves will be of Sienna marble, with panels of black marble, on which, in letters of gold, will be inscribed the names of the fallen officers.

Metropolitan Association of Medical Officers of Health.—The medical officers of health recently elected in the metropolis under the Local Management Act of Sir Benjamin Hall, have formed themselves into an association for the purposes of mutual assistance and the advancement of sanitary science. Mr. Simon, of the General Board of Health, has been elected the president for the present year; Dr. Thomson and Mr. Liddle, vice-presidents; Dr. Aldis, treasurer; and Dr. Hillier, secretary. Provisional committees have been appointed to inquire into various subjects affecting the public health, such as the sale of unwholesome meat, the condition of the vaults under the metropolitan churches, &c. There are in the metropolis at present forty-seven medical officers of health.

The New Church of St. John, at Isleworth. —This church is situate at Woodlands, near Springgrove, and is in the Perpendicular style, from the design of Mr. Deason, architect. The chief materials are Kentish rag, with Bath stone dressings, and the edifice is ornamented at the south-west angle by a tower, 80 feet high. One of the principal features is an open timber hammerbeam roof. The pulpit is of Caen stone. Messrs. Dove, Brothers, of Islington, are the builders. The church is calculated to hold upwards of 800, and has been erected at a cost exceeding 5,000*l*.

Kilkenny Archæological Society.—The July meeting of this society was held at Kilkenny on the 2nd ult. when fifteen new members were elected, and various presentations to the library and museum of the society made. A communication was then read on the Insignia of the Corporation of Cork by Mr. R. Caulfield. Fac-similes of remarkable autographs were sent by Mr. H. J. Hoare, from the State Paper Office. A communication on the antiquity of clay tobacco-pipes was received from Mr. G. Bem, of Liverpool. Other papers were afterwards submitted to the meeting, which then adjourned to the first Wednesday in September.

Street Pavement.—In the number of the *Builder* for July 27th is an article on street paving. I have thought much on this subject, and I would suggest the following;—A lime concrete foundation 6 inches thick, on which place lines of wood blocks, each block 10 inches deep, 4 inches thick, and 10 inches long, and dowelled together endways, leaving a space 4 inches wide between each line of wood blocks: fill up between these rows, from lime concrete foundation, with Portland cement concrete 8 inches high, and on the top of that lay 2 inches deep of asphalte: strew over the whole small shingle. This last should be renewed now and then. The wood blocks to be impregnated with creosote, to make them impervious to water; the cross joints of wood blocks to be broken half-way of length of block each alternate row of blocks. The Portland cement concrete swells as it sets, and the asphalte, when the shingle works into it and the wood, increases both, and presses all firmly together.—S. P. H.

Highfield Adjustable Circular-Saw.—This invention consists in securing a circular-saw to its spindle in an oblique direction, so as to make a saw of the common construction to cut grooves or rebates of any required widths. Between the saw and the collar on the spindle are two bevilled washers, each capable of being turned round independently of the other; and on the opposite side is a plain washer, having a concave recess for receiving a convex nut, which screws on to the end of the spindle and secures the saw firmly thereto. The whole is so arranged that by changing the relative positions of the two bevilled washers, a surface more or less oblique with the axis of the spindle is presented for the saw to be screwed against. Thus the obliquity of the saw with the axis of the spindle may be varied at pleasure, and grooves or rebates of various widths cut into the wood submitted to its action.

Manufacture of Bar-iron.—Mr. W. Clay, of Liverpool, has patented a process relating to the employment of rolling pressure for the conversion of bar-iron of various sectional figures, as, for example, plain, straight, square bars, or bars of angle iron, or T or chaunel grooved or trough iron, into taper bars, the object being to impart to bars of iron so made different strengths or powers of resistance at different points. The invention also relates to the adaptation of rolling pressure to the formation of bars, with sudden as well as gradual irregularities of depth or thickness, by which means it is proposed to form projections, protuberances, or indentations on or in the bars at different points, according to the particular purposes for which the iron may be required.

Credence Table.—A writer in *Notes and Queries* says,—"I saw it stated in one of our quarterly periodicals in 1852, that 'credence table' was derived from an obsolete German verb, *Kredenzen*, to taste, owing to the elements being placed on the credence table with a view to their being publicly tasted (before consecration) by a person appointed for that purpose, whenever the monarch was about to communicate, lest poison intended to destroy the monarch should be mixed with the bread or wine."

Trinity High-Water Mark.—In reply to "An Old Subscriber," of the 5th ult. I beg to state, 1st. Trinity high-water mark is placed in various parts of London, as described in the "Register of Tides in the River Thames," printed by order of the Honourable Court of Commissioners, of the 26th of October, 1849, and every bench-mark in London is shown in feet and decimals of feet above an oblate spheroidal datum plane, decreasing in radii towards the north pole from the centre of gravity between the parallels of latitude at London and Liverpool, about 2·02 feet, or 24¼ inches, which is evidently worthy of consideration, at a rate of 2 feet to the mile in 40 miles of sewer. 2nd. The difference at Liverpool is also given in the aforesaid report; and this may prove of public utility if reported on by the engineer employed in the levelling of the main drainage of London. The Ravensbourne drainage is a specimen of such levelling. 3rd. The information concerning the old dock-sill at Liverpool is in the possession of Mr. Newlands, borough engineer, of Liverpool. 4th. The approximate mean water at Liverpool is 12½ feet below the level of Trinity high-water at London, as described identical with the level of the datum plane of the Ordnance survey of London, which is also 12½ feet below the level of Trinity high-water mark. And all the information required is given in the aforesaid report, and has been published through the medium of the *Builder* in 1849, pp. 458 and 586. I agree with your subscriber in the desirability of a clear understanding, and it may not be improper here to observe that, where the medium of gravitation is resorted to as the agency to effect the grand object in draining London, the difference of altitude of the mean tide at the equator and the north pole is 22 miles, and in the same ratio of an oblate spheroidal figure between the parallels of latitude of the extremities of any sewer, &c. James M'Cleary.

Building Notes—Edinburgh.—The Dean of Guild Court have objected to the new plans for the Life Association's Offices in Princes-street, and operations have again come to a perfect stand-still. The last architect whose plans have been approved of by the Association was Sir Charles Barry. No fewer than three architects have been engaged on the plans, and their different designs have each been received, tried, and found wanting. A projecting cornice in the last plans, which would be prejudicial to the appearance of the adjacent buildings, has raised the opposition of the members of the New Club, who have accordingly determined to do everything they can to prevent the erection of the intended building. It has also been objected that it was proposed to raise the building six stories high, three being in entresol. This runs contrary to the regulation that no house should be more than five stories high. Operations have been recommenced for the completion of Melbourne-place. The corner adjoining Victoria-terrace will be entirely built, and will finish the original plan of the Improvement Commissioners in this part. We are not sorry to find that, after so many years of inactivity, the half-built appearance of George the Fourth Bridge may now be partially removed. The erection of Dr. Alexander's church, and the probable enlargement of the County Buildings, together with the present operations, will go far to assist in this desired object, and may perhaps induce other parties to come forward and purchase some of the vacant building stances. The new buildings are, as before, by George Smith, architect—Mr. Steven being builder and proprietor—and will be of the same Elizabethan character as the other part of the street. In digging the foundation, the builders have come on some of the old walls and cellars of the closes which formerly occupied this spot, and which had been built over in the direction of the bridge.—*Building Chronicle.*

Dust in Railway Travelling.—The New York Central Railway directors have nearly completed arrangements intended to obviate the inconvenience occasioned by dust in transit. The plan is simply to box in the running gear down to within two or three inches of the rail, and to extend tarpaulins over the open space between each car. Advantage is also gained in deadening the sound of the wheels.

"The Royal Gallery of Art."—No. XVIII. of "The Royal Gallery of Art" (Colnaghi and Co.) the last published, contains, "Charity," by Van Eycken, very well engraved by Lightfoot; "The River Bank," by Vander Heyde; and F. Mieris's "Teasing the Pet," engraved by R. C. Bell. The last is not a very excellent specimen of the master, but his works are rare. The previous part contained, amongst others, "The Scene from Midas," by Maclise.

[ADVERTISEMENT.]

27 and 28, Bishopsgate-street, Aug. 1st, 1856.

Gentlemen,—After twelve years' experience of your Patent Iron Revolving Shutters, I have much pleasure in testifying to their great superiority over all others; and if I were to put in a new front to-morrow, I should most decidedly give them the preference.

I am, Gentlemen, yours, &c.
Robert Alex. Rooney.

Messrs. Clark and Co. 15, Gate-street, Lincoln's-inn-fields, Engineers.

TENDERS

For Chambers to be erected in Fenchurch-street, City. Mr. E. I'Anson, architect:—

Holland	£18,624	0	0
Cubitt and Co.	18,472	0	0
Mackenzie	18,400	0	0
Todd	17,999	0	0
Wilson	17,550	0	0
Lucas	16,773	0	0
Ashby and Horner	16,650	0	0
Piper and Son	16,292	0	0
Thompson	16,240	0	0
Ryder	15,840	0	0
Jay	15,716	0	0

For the erection of a New Wing, and sundry other works, at the Westminster Bridewell. Mr. F. Pownall, architect. The quantities supplied by Mr. C. J. Shoppee:—

Lawrence	£11,940	0	0
Hayward and Nixon	11,700	0	0
Lucas	11,560	0	0
Jay	11,540	0	0
Myers	11,400	0	0
Dove	11,233	0	0
Piper	10,490	0	0
Pollock and McLennan	10,087	0	0

For the National Schools, Luton. Quantities supplied by Mr. C. Polard. Mr. J. Cumberland, architect:—

Greigg	£3,600	0	0
Longman and Co.	3,476	0	0
Dales	3,449	0	0
Woodroffe	3,419	0	0
Quarterman and Co.	3,294	6	0
Clark	3,000	0	0
Hopkins	2,853	15	0
Kirkby	2,845	0	0
Smart	2,760	6	7